ForesTalk

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Cover: The rains of autumn once again mark the changing of the season. This issue's cover photograph of water droplets gleaming from blades of grass is by Victoria freelance photographers Gary and Judy Green.

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Imagine a strip of forest one kilometre wide stretching all the way from St. John's, Newfoundland, to Vancouver. Then imagine it doubling back to Toronto. That amounts to about one billion trees, which is the total number of seedlings the Ministry of Forests has planted since 1930. It has taken half a century to reach this point; the two billion mark should be reached by the end of the decade. Clearly, we have made considerable headway in silviculture in the past fifty years.

Tom Waterland

Hon. Tom Waterland, *Minister of Forests*

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GETTING THE BUGS OUT

by Gord Price

Ron Edward is on the hunt.

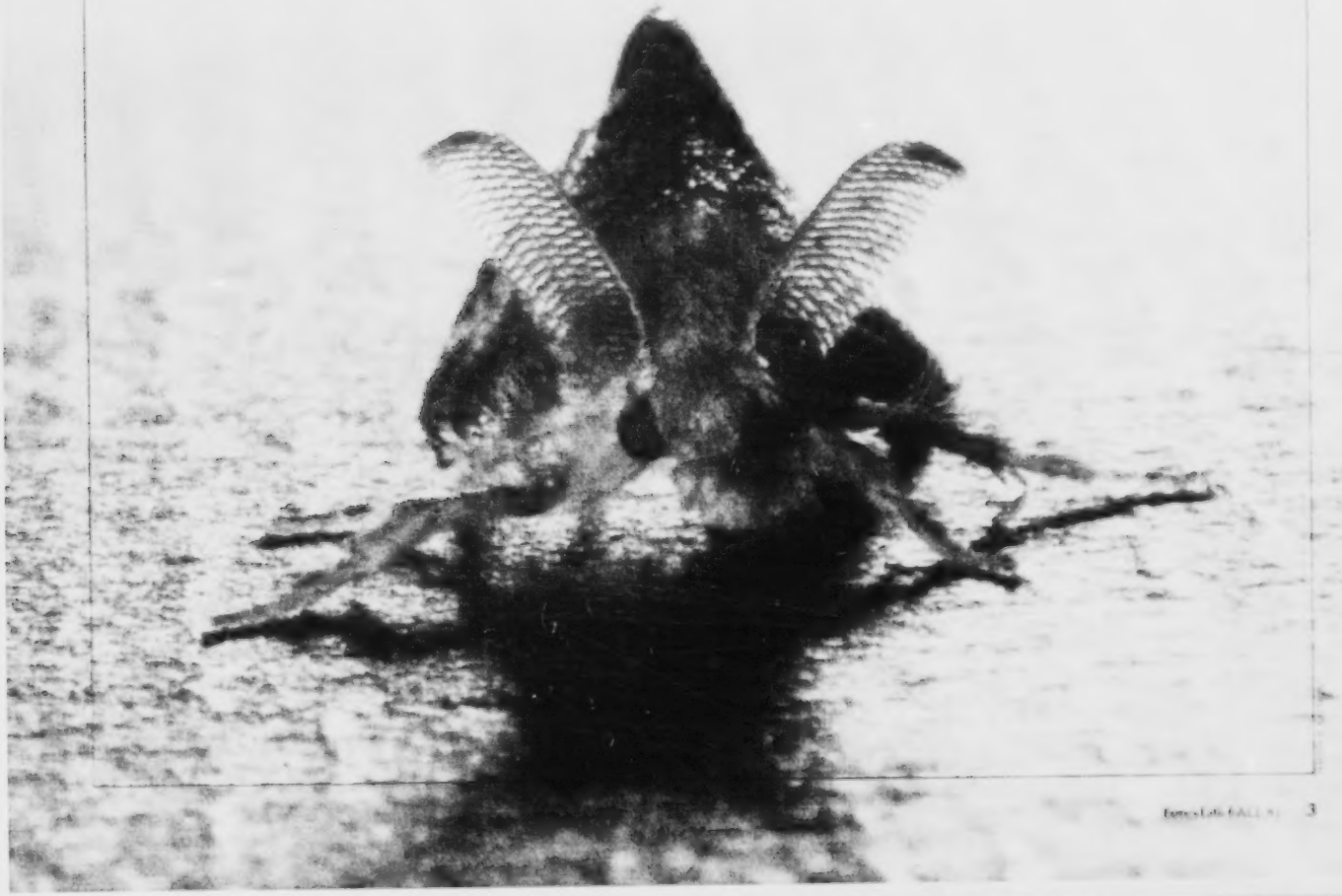
The corridors of the Ministry of Forests regional office in Kamloops are filled with furniture while the painters move in to recamouflage the office walls. Edward finally spots the misplaced filing cabinet and grabs a bottom drawer.

As a fire-fighting veteran for the Ministry of Forests, Edward is used to change; for over 20 years he's lived in an environment where decisions have to be made in a hurry. These days he's fighting another kind of forest threat, one that's less showy and a lot slower-moving than fire, but one that produces the same final product: dead trees.

He flips through a file and pulls out a picture of his prey. It's a thumb-sized, handsomely patterned furry caterpillar that goes by the name of *Orgyia pseudotsugata* — the Douglas fir tussock moth.

Not that Edward exactly thinks of *Orgyia* as cute. To him, it's just one of about a dozen destructive forest pests that menace the Kamloops Region, a forest region that seems to get a little of the worst of everything from the mountain pine beetle to mistletoe to the western spruce budworm, not to mention that old standby, fire.

Having spent most of his working life fighting fire, Ron Edward now is handling the administrative details for a major pest management program. This change reflects the increasing priority the Ministry of Forests is giving to fighting the tree borers, defoliators, diseases, rots and fungi that annually eat, weaken and kill enough B.C. timber to build 714,000 average-sized houses.



The tussock moth (previous page) makes its home in Douglas fir trees in B.C.'s southern interior. By early June the moths' eggs hatch tiny larvae which feed voraciously on the trees' new growth (above). Once that's gone the larvae eat the old growth as well. Normally the moths aren't numerous enough to cause serious damage, but every six to eight years tussock moth populations reach epidemic proportions and threaten to defoliate entire forests. This is one of those years. The moths were in such abundance this past spring that 73 larvae were gathered from just one tree branch (and eaten).

For years, the losses to B.C.'s forests from insects and disease went largely uninvestigated. Not much could be done about the situation anyway, and fire was a more obvious and manageable threat. But thanks in part to the research and inventory work of the Canadian Forestry Service, knowledge of the pest problem increased. And this knowledge generated demands for solutions, particularly as the industrial and public demands on the forest resource base continued to grow.

Ironically, more efficient fire protection has resulted in a change in the traditional life cycle of the forest ecosystem, in some places providing a superb habitat for insects. In parts of the province the numbers of certain insects — notably the mountain pine beetle — are out of hand.

More than just the obvious economic losses are involved. The modern resource manager has to take into account the effects of forest infestations on recreation, wildlife, water and even aesthetics. Consequently, the role of the Protection Branch has been enlarged to deal with the increased scope of the forest pest threat: a separate Pest Management Section was established, with a Victoria headquarters staff of three and pest management teams in each of the province's six forest regions.

Section head Bob DeBoo stresses the need for management tools appropriate to the complex and diverse natural environments of British Columbia. "And that means more than the occasional spraying of a chemical on a problem," he emphasizes. "It means recognizing that pest management is a basic part of forest management, not a defensive afterthought to be called on only when an infestation reaches epidemic proportions."

Good pest management begins with the selection of disease-resistant seedlings for reforestation, or perhaps the creation of a forest mosaic, with a mix of tree species of different ages, to act as a barrier to a possible pest epidemic. As the forest grows, selective thinning operations weed out infected trees — a highly successful and cost-efficient technique for managing mistletoe. Trap trees — specially felled trees that offer a tempting habitat for insects — can concentrate insects in one location and prevent their spread. Pheromones, or sex attractants, can entice bugs out of the woods and into poisonous "boudoirs."

Then, of course, there are pesticides — the tools of last resort but the ones with the highest public profile. The principal types of pesticides are insecticides, herbicides and fungicides. As it happens, the Ministry of Forests has used such chemicals rather sparingly.

Since 1929 it has used chemical insecticides 26 times; since 1950, only 12 times. In the past six years the Ministry has used insecticides in the service of pest management only twice: once for experimental purposes and once operationally against the tussock moth.

In each of the past three years herbicide application permits (the responsibility of the Pesticide Control Branch of the Ministry of Environment) have been issued for the treatment of about 8000 hectares of forestland scattered throughout the province. Chemical fungicides are largely restricted for use in forest nurseries operations. DeBoo points out that "the Ministry

To protect the forests of the Similkameen River valley from the tussock moth caterpillar (left), this past June the Ministry of Forests and the Canadian Forestry Service organized a full-scale moth counter-attack. The weapon of choice, nuclear polyhedrosis virus (NPV), is a virus that attacks the moths' cells. The idea was to infect the newly-emerging larvae before they could begin defoliating the trees.

NPV occurs naturally in it is not a synthetic chemical and doesn't appear to harm organisms other than the tussock moth. The first step in the pest control program was to take sample branch clippings (top) to determine the location and extent of the moth populations.

is committed to neither large-scale nor continuous application of pesticides in the forest. We only use pesticides — including herbicides — in specially selected circumstances and have never applied them to the same area on a repetitive basis. They are used only where they are justified both environmentally and economically. Our main concern is to *prevent* large pest outbreaks from happening.

The point is that chemicals are just one management tool we use — the one least frequently used at that. But they let us do the job when the situation calls for it.

Biological agents such as bacteria and viruses are being looked at seriously as an option in the future. We're cautious. We're just starting to try them out, and the consequences are not fully known. But there are some very positive possibilities. I'm particularly optimistic about a trial we ran on the Douglas fir tussock moth this summer in the Kamloops Region.

Ron Edward pulls out a new more sheets from his file and flips through a chronology of tussock moth outbreaks compiled by the Canadian Forestry Service since 1940. A clear pattern has emerged. Every six to eight years, a moderate to severe outbreak has occurred in the southern interior. In fact, Edward can drive five minutes north of Kamloops and survey thousands of hectares of grey, rotting snags, grim evidence of the moth's last infestation.

The moth can be found at any time in the dry forests of the southern interior (along with about two thousand other species of insects), but isn't usually numerous enough to cause serious damage. From late May to early June, depending on the weather, the eggs will hatch into tiny white caterpillars (larvae). Feeding voraciously on the tree's new and old growth, they will work their way through five or six growth stages.

After spinning a cocoon and retir-

PHOTO R.J. CHALLENGER

PHOTO R.J. CHALLENGER

The NPV was sprayed from a helicopter in the still air of pre-dawn (above). To test if the fine spray fell in the right density and was properly distributed, foreman Rick Chorney (right) of the spray monitoring crew laid out a series of cards along the Princeton airport runway and throughout the sprayed forest plots.

The beauty of biological control agents such as NPV rests in the fact that so long as a few larvae feed on the contaminated tree shoots, the infection will spread naturally throughout the whole moth population.

ing for a few weeks, the caterpillar will emerge as an adult moth, usually in August. The wingless female sits on her cocoon perfuming the air with a sex attractant, awaiting the more mobile males. She finally lays her eggs in a sticky mass on the underside of limbs in the crown of the trees. When spring arrives and the tree puts out its new shoots, the hungry larvae emerge ready to begin the cycle anew.

The tussock moth larva prefers the tender new foliage of its Douglas fir hosts, but when that runs out it will progressively defoliate the entire tree, then move on to other tree species and even to broadleaved brush. A Douglas fir might survive moderate defoliation for one season, but if attacked again probably wouldn't survive another year; its vulnerability to other insects also increases dramatically.

The individual tussock moth is just a bit player in a larger drama: the periodic rise of the moth population to epidemic proportions. The last such infestation ended six years ago; the southern interior was due for another outbreak, and the people in the Protection Branch and the Canadian Forestry Service knew just where it was going to hit.

The narrow twisting valley of the Similkameen River from Princeton to Keremeos crowds in a highway, a river, some dirt roads, several rights-of-way, patches of farmland and strips of forested grazing land. Fir and pine cover the slopes to the top of rounded ridges, except where the folded and faulted rock is exposed and crumbling away. Aspen and cottonwood hug the river; warm winds rush up the valley in summer. This is very agreeable country for the tussock moth.

An earlier survey had found high densities of egg masses in forested clumps all along the highway and south of the river. Come late May, this stretch of the valley was ripe for a tussock moth infestation. But coming right along with it was a band of federal and provincial scientists, techni-

cians and foresters ready to engage in battle with the insect.

The weapon of choice is a *nuclear polyhedrosis virus* (NPV). NPV is as natural and indigenous a tool as can be found: a virus that attacks an organism's cell nucleus and is usually found in association with the tussock moth. The moth is most vulnerable to the virus once it has consumed everything in sight and is in a weakened state. However, scientists speculate that the tussock moth can be affected by the virus *before* moth populations reach epidemic proportions and destroy millions of trees. They expect that NPV can then keep the insect in check, with no effect on other nearby organisms.

The pale light of dawn casts faint shadows across the tarmac at the Princeton airport. The strong, sweet smell of molasses fills the air as technicians prepare a concoction of water, dye, a sticking agent, syrupy coffee-coloured NPV — and the molasses, which prevents deterioration of the mixture in sunlight. The NPV, brought in from the federal forestry labs at Sault Ste. Marie in Ontario, is really nothing more than crushed-up tussock moth infected with the virus. It's expensive and it's used sparingly; only 400 litres of the final mix are poured into the special tanks attached to the helicopter.

Smoke is rising straight up from the stacks of the local sawmill; the air is perfectly still. The time to move is exactly right: tussock moth larvae are emerging from their eggs after a long winter's sleep, ready to feast on tender new shoots. The day before, a dozen student technicians took some cuttings from the trees and counted the number of tiny caterpillars — over 70 to the branch in some cases.

The "snick, snick" of the helicopter blades cuts through the morning calm. The pilot flies down the valley, the river now flowing high and mighty in spring flood. Flags are flying from tree tops to guide the helicopter to the four selected plots to be sprayed. The amount of NPV to be used is miniscule — like a sprinkle of salt on a vegetable patch. But that's the beauty of biological control agents; so long as a few larvae feed on contaminated tree shoots, the infection will spread naturally throughout the whole moth population.

The pilot is scrupulous in his approach, first taking trial runs, then waiting for the wind to still, staying well clear of the river and spraying only the precise area marked. His passes are perfect; the ground crew is practically ecstatic at the results. Little cards placed on the forest floor show that the spray was well distributed in the proper density.

Not all the infected stands of trees are sprayed with the virus. Some are left untouched, allowing the moths in these areas to munch away unhindered. Later, comparisons will be made between untreated and treated stands.

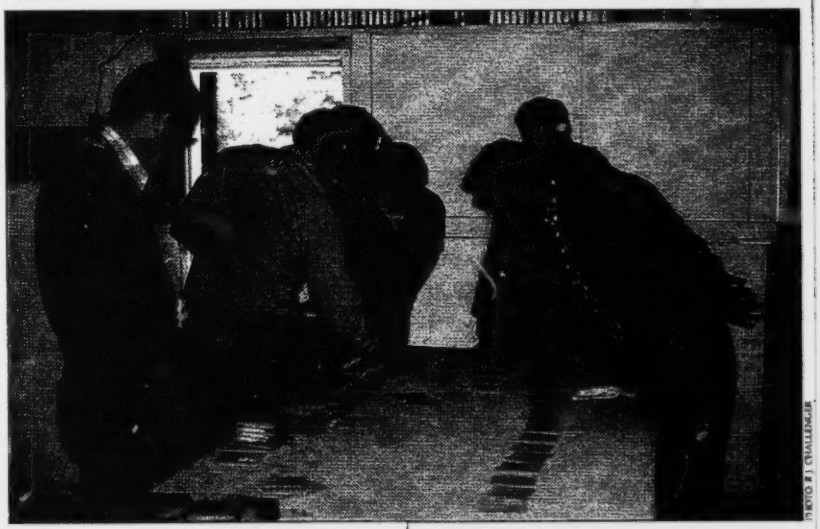


PHOTO BY J. CHALLENGER

The next day other crews will spray individual trees from the ground. This is an operational trial, and both the pest managers and scientists want to learn, in addition to the effectiveness of NPV, which method of application will work best for the least cost. It will be later in the fall before it can be confirmed if the introduced virus was successful in containing the tussock moth outbreak. A lot of people across the country will be watching the results, not the least of them Ron Edward.

Fighting the tussock moth is not the same as working on a fire line. The battle is slow and victory is never so clear. A few stands of Douglas fir may be protected along the Similkameen, but millions of tussock moths live throughout the interior forests. Another outbreak is only to be expected.

But what makes this program so exciting to forest managers is the prospect of developing an effective, natural control for at least one major forest pest. ◻

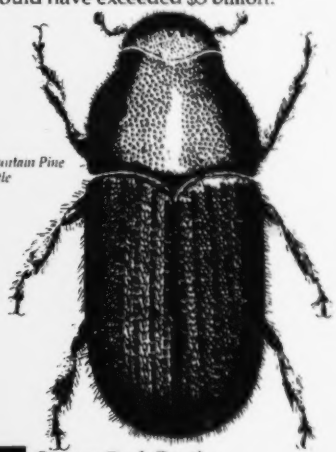
Looking over the results of the NPV spray program are Ministry of Forests' Ron Edward** (centre-left with blue cap), **Canadian Forestry Service scientific advisor Dr. Roy Shepherd** (front-left in green sweater) **and the rest of the spray crew. The spray operation itself was right on target, but unseasonably cool temperatures in June delayed the spread of the NPV. In the heat of July, however, the virus had its desired effect, and the tussock moth populations in the spray areas suffered high rates of mortality. This operational trial is considered a success, and the information gathered here will help researchers plan future pest control operations.

TOP 10
FOREST PESTS IN B.C.

There are hundreds of insect and disease species which cause trees to die or reduce their growth, but relatively few of these exist in large numbers. Some are cyclical. (There has not been an outbreak of hemlock looper for 30 years, for example, but one could start tomorrow.) So foresters try to intervene in the case of about 10 insects and 10 diseases, and monitor the condition of the rest. Listed below are the 10 most damaging pests to B.C.'s forests.

1 Dwarf Mistletoe
This parasitic plant lives on interior lodgepole pine, Douglas fir, larch and coastal hemlock. It siphons off the nutrients that ordinarily would go towards tree growth and may cause distortion in the tree trunk and limbs. Mistletoe doesn't usually kill trees, but the loss of tree growth it causes is estimated to be one third of the 16 million cubic metres of wood claimed by insects and disease annually in B.C.

2 Mountain Pine Beetle
The mountain pine beetle bores under the bark of mature lodgepole and ponderosa pine, leaving behind a blue stain and eventually killing the tree. If infected trees are logged out quickly the lumber can be salvaged. Also, attempts are made to harvest stands of timber likely to be infested by the bug and so deny it its major source of food. If all the wood destroyed by the mountain pine beetle in the past five years instead had been exported, the total export value would have exceeded $5 billion.


Mountain Pine Beetle

3 Spruce Bark Beetle
This insect kills trees in the same manner as the mountain pine beetle, only its hosts are Englemann, Sitka and white spruce. In parts of the Prince George Forest Region all logging activity is focused on salvaging beetle-killed trees or on trying to prevent the beetle's spread.

Western Spruce Budworm

4 Western Spruce Budworm
Despite its name, the western spruce budworm feeds on Douglas fir, true firs and spruce. Its prime target is Douglas fir in the Vancouver, Kamloops and Cariboo Regions. A defoliator, it causes tree deformities, loss of tree growth and finally, tree mortality. This is not the same species of spruce budworm that has wreaked havoc with forests in eastern Canada. The extent of damage in B.C. caused by the western spruce budworm is still being assessed.

5 Root And Butt Rot
This is a fungus which infects the roots of coastal hemlock trees, eventually killing them. Simply cutting or removing the infected trees will not necessarily eliminate the rot; it can remain in the ground for decades and infect trees planted later. This makes root rot a serious threat to the forests, and the only treatment for it is remove the infected stumps.

6 Laminated Root Rot
This is a different fungus which infects the roots of important tree species such as the coastal Douglas fir.

7 Douglas Fir Tussock Moth
This insect is a defoliator; it kills trees by eating the new and old foliage on Douglas fir trees. Infestations last four to five years and then collapse due to a naturally occurring virus. Experiments aim to introduce the virus earlier in order to check the spread of the moth.

8 Douglas Fir Bark Beetle
This insect is a chronic problem in mature and overmature Douglas fir stands, particularly in the B.C. interior. Though not widespread at the moment, this insect can kill trees previously weakened by the western spruce budworm or Douglas fir tussock moth. It does so by boring under the bark in the same manner as the mountain pine and spruce bark beetles. Trap trees can attract the insect and prevent its spread to some extent.

9 Cone And Seed Pests
A variety of insects and diseases are capable of destroying whole crops of tree cones and tree seed. For example, no seed could be collected from spruce trees in the Prince George area in 1979 because of the presence of disease. Also, seed and cone insects and diseases can threaten the survival of seed orchards, where the seed for future generations of trees is developed.

10 Plantation Insects And Diseases
Insects and diseases also pose a serious threat to the survival of new tree plantations. The black army cutworm is an example of one insect that in certain years has destroyed much of the new planting done that year. Various shoot and root feeders can cause deformities and loss of growth in new trees.

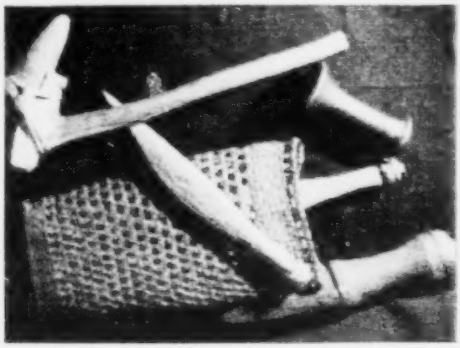
Root Rot

People Of The Cedar

by **Grant Ellis and Maggie Norris**

Canoes, totem poles and longhouses, the most familiar aspects of Northwest Coast native culture, are still very much in evidence in B.C. But the advance of technological culture has created some interesting paradoxes: A famed maker of dugout canoes spent years building vessels of steel in a coastal shipyard. A puller on a champion racing team, who spends summer evenings in a handbuilt cedar canoe, works in a sawmill that cuts up hundreds of cedar logs daily. At one Port Alberni mill, the hereditary chief of a band of West Coast native peoples is foreman. From the new, highly automated log deck built over tidewater along the Alberni Inlet he looks down on the tiny cedar house of his aunt, and on the even tinier cedar smokehouse in which she is drying salmon. While he supervises the movement of tons of plywood produced at high speed, she quietly weaves the baskets that have made her famous.

Mary McKay is moving grasses



Traditional weaving is very fast.

Totem pole carving is hard work.

These are people of B.C.'s coastal forests — the Haida, the Nootka, the Kwakiutl, the Coast Salish, the Bella Coola and Tsimshian. In the dim past their forebears arrived here from an untremembered Asian homeland. Other peoples, too, had crossed the Bering Strait, they remained in the north, or spread across wide prairies or settled in the hospitable interior valleys, or moved on to the distant deserts and jungles to the south. But the coast peoples favoured the strip at and along the Pacific's northern rim and there stayed to live with one foot in the surf and the other in the forest.

The sea was a generous supplier of food, but the forest was central to their fun, lumberyard, shipyard, pharmacy and playground. The Europeans who stumbled on the native peoples' townsites were startled to find a stable, complex culture largely based on wood. The coast peoples lived comfortably in big, multi-family houses, some may have travelled as far as California to export their canoes, their carving and sculpture were among the finest aboriginal work anywhere.

The three things the world associates with Northwest Coast culture — totem poles, dugouts and longhouses — were made of western red cedar. Of these, the dugout canoe offered the most exciting benefits: trade, wealth, adventure, intermarriage with other villages. Yet cedar's life was not taken lightly. The elders of the family often apologized to the tree before felling it.

Nootka, the name, actually means "go around," and refers to the way the people would circle their village in their canoes when welcoming visitors from other villages. Nootka Island, on the west coast of Vancouver Island, is the home of the Nootka people. Their territory extends from Clayoquot Sound in the south to Kyuquot Sound in the north. Nootka Island is about 40 kilometres long and 16 kilometres wide, and is separated from the mainland by Nootka Sound. Its rugged, rocky coastline is deeply indented with bays and inlets, and its interior is covered with dense forests.

Nootka Sound was the first place on the coast visited by Europeans. In 1778, Captain James Cook sailed into the sound and dropped anchor in Resolution Cove. Cook's men were the first white people to see the Nootka, and the Nootka were the first people to see white men. Cook's men were also the first people to see the Nootka's cedar canoes, which were unlike any they had seen before.

Nootka canoes were made from a single log of cedar. Some were as long as 20 metres and could carry as many as 40 people. Nootka canoes were also very seaworthy. They were used for whaling, sealing, fishing and trading. Nootka whalers would paddle their canoes out to sea and wait for a whale to swim by. When a whale was spotted, the whalers would paddle their canoes as close to the whale as they could. Then they would throw their harpoons into the whale's body. The harpoons were attached to long ropes made from cedar bark. The whalers would then pull the whale to shore and cut it up for food and oil.

Nootka canoes were also used for sealing. Sealers would paddle their canoes out to sea and wait for a seal to swim by. When a seal was spotted, the sealers would paddle their canoes as close to the seal as they could. Then they would throw their harpoons into the seal's body. The harpoons were attached to long ropes made from cedar bark. The sealers would then pull the seal to shore and cut it up for food and oil.

Nootka canoes were also used for fishing. Fishermen would paddle their canoes out to sea and cast their nets into the water. When a school of fish was spotted, the fishermen would paddle their canoes as close to the school as they could. Then they would pull their nets to shore and cut the fish up for food and oil.

Nootka canoes were also used for trading. Traders would paddle their canoes out to sea and meet other traders from other villages. They would trade goods such as furs, blankets, and copper. The traders would then paddle their canoes back to their own villages.

Nootka canoes were also used for transportation. People would paddle their canoes out to sea and travel to other villages. They would take their families and their belongings with them. The canoes were also used to transport the dead. The bodies of the dead were placed in the canoes and paddled out to sea. The canoes were then set adrift.

Nootka canoes were also used for ceremonial purposes. The canoes were decorated with paint and carvings. The canoes were then used in ceremonies such as potlatches. Potlatches were feasts that were given by chiefs to celebrate important events. The chiefs would give away their wealth to the guests at the potlatch. The guests would then give gifts to the chief in return.

Nootka canoes were also used for warfare. Warriors would paddle their canoes out to sea and attack other villages. They would take captives and bring them back to their own villages. The captives would then be enslaved.

Nootka canoes were also used for hunting. Hunters would paddle their canoes out to sea and hunt for whales, seals, and other animals. They would then bring the animals back to their own villages. The animals would then be used for food and oil.

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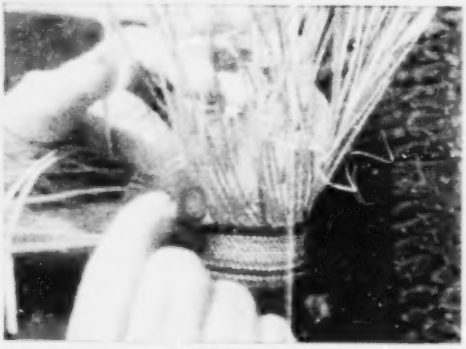


Paintings done at Canadian Forest Products Vernon Lake Camp by Victoria artist Char Davies

CAULK BOOTS, STANFIELDS & FIVE-WEEK SHIFTS

by **Grant Ellis**

Quarter of six on a wet morning on Wakeman Sound and the cookhouse is getting lively. The men sit six or eight to a round table, putting away breakfasts of eggs, ham, sausage, bacon, homemade bread, and a range of side dishes. At one table, the mechanics; at another, the logging contractor, the camp superintendent, the truck drivers, and a heavy equipment mechanic overnighting to put some equipment right; at the others, the fallers and rigging crews. The young men who work in the woods are mostly dressed in wide-bottom jeans, Stanfields underwear, plaid flannelette shirts, and braces. They have the energy to be boisterous before sunup. One by one, they get up and head for the lunchroom, where they fill paper bags with fruit, dessert, and monumental sandwiches they construct themselves.

Outside the rain is coming straight down; there's not a glimmer of hope that the weather will change in the next few hours. The loggers pull on their rain gear and clump to the door. The crummies await them across 200 feet of water and mud.

Logging camps can be quickly divided into two categories: remote camps, usually reached only by plane or boat, and "downtown" camps, where workers can put in a conventional work week and go to their own homes at night. The differences are significant; during a work shift, which may last for up to five weeks, the people who work the remote camps are practically a clandestine society. Casual visitors are unheard of; there are no private telephones; even the nearest town is a fair distance away by plane or boat. The world's largest floatplane fleet services the camps, tucked away in remote inlets; boats and barges bring freight and equipment.

There is a pattern to the logging camps, starting with the operations shack, nerve centre for more activity. There is a cookhouse. There are mobile homes for the married people. There is a shop for vehicles. There is a Rec Hall, a commissary, and the single men's bunkhouses, of which the rowdiest, usually housing the younger men, is known as the "Zoo." There is a first aid room.

Trees represent B.C.'s economic life, and the camps are where the trees are. There are an estimated 250 camps along the coast which are remote enough to require cookhouses and bunkhouses. Most of these are on the mainland, and most are run by independent logging contractors for the large forest companies. There are another 25 remote camps in the Prince George area, but most camps in the B.C. interior are of the downtown variety, within easy reach of communities.

The common denominators in all the camps are rain, mud, camaraderie, rugged work, and good-natured skepticism. And what are the workers' motives for going there? "They go to those remote camps to get a stake," says one old faller. Basic pay for a faller is $175 a day. At British Columbia Forest Products' operation on Wakeman Sound, for example, the crews work a nine-hour day and a six-day week, working five weeks between eleven-day breaks.

Camps like Wakeman may not be easy to find on your B.C. road map. Wakeman is about 120 miles north of Campbell River on the mainland, an arm of Kingcome Inlet.

The remoteness can be an advantage to a man who wants to save his money. There is little to spend it on in camp, although a man can work up a $200 beer bill between paydays, and blow all of his money in one trip to Vancouver. No money changes hands in camp; goods and groceries ordered through Woodward's come in weekly on a commercial boat and

Trees represent B.C.'s economic life, and the logging camps are where the trees are. The common denominators in all the camps are rain, mud, camaraderie, rugged work and good-natured skepticism.

are charged through the company. Beer and minor commissary purchases are likewise deducted from an employee's cheque. So, with a modicum of restraint, an employee can put himself ahead financially.

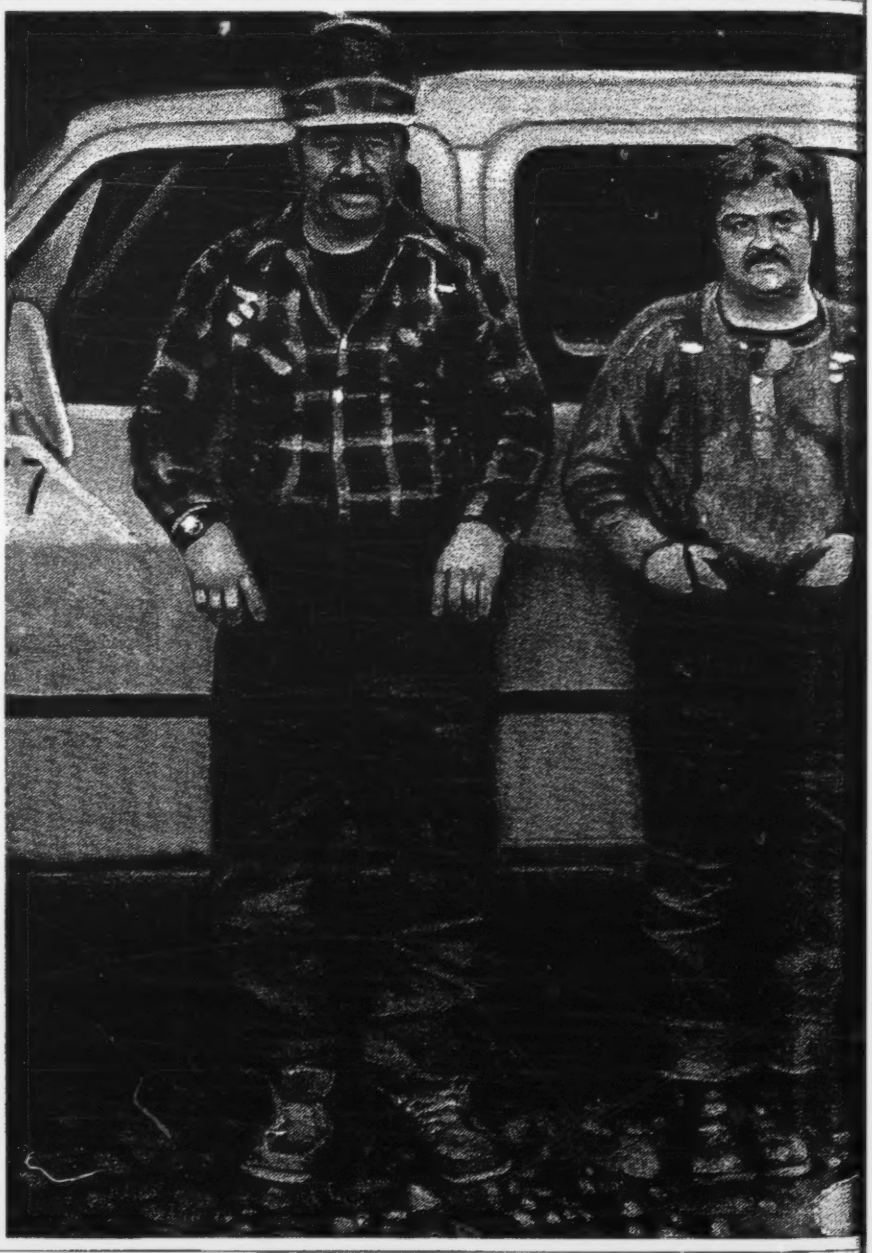
But money is not the only reason for coming to the camps. It is acknowledged by camp superintendents like Bob Murrants of BCFP that some men come to get away from their troubles. Here they are accepted, and the hard work is therapeutic. It is a sort of French Foreign Legion, replete with laughter, a touch of danger, and practical jokes in the evenings.

"It's hard on marriages," says Lucien Belanger, second cook at Bedingfield Camp north of Tofino. "Those long shifts away from home — women get lonely." Belanger, separated from his wife for six years, has worked in camps from Labrador and James Bay to Vancouver Island. His camp is operated by Pat Carson Bulldozing, probably the largest of many independent logging contractors on the coast. Carson runs the logging and the camp for MacMillan Bloedel's Estevan Division. It does not have a rigorous schedule; 21 days in camp and seven days at home. Belanger's preference is 15 days in and six days out, but few companies can pay the transportation bill to send their people home that frequently and still remain profitable. Then there are the men who want the long shifts and the overtime to increase their income.

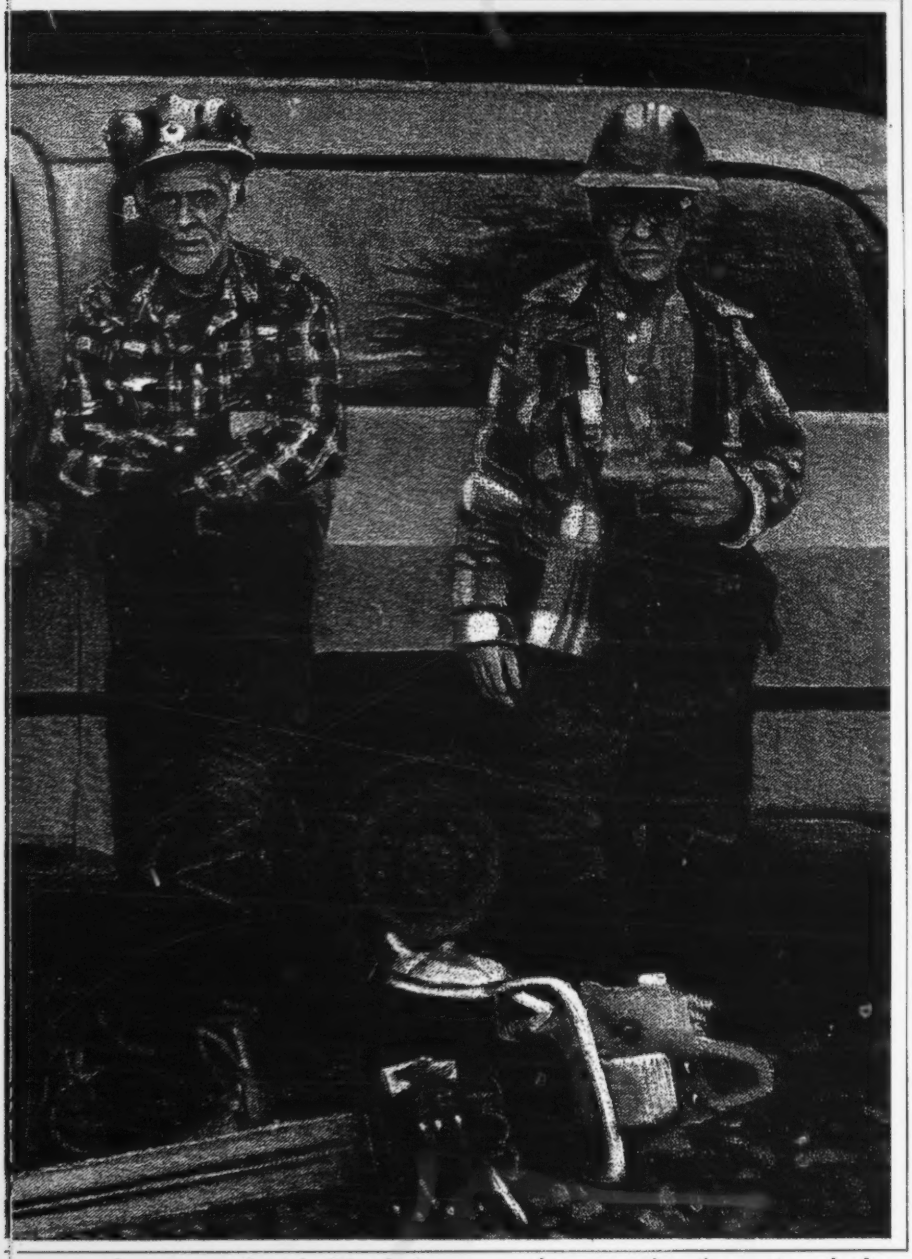
The men in any camp are a mix of crusty old-timers and rowdy young bucks anxious to prove their manhood, with all the variations in between, including the sardonic loners and the irrepressible extroverts for whom camp life is ideal. One faller who has been around logging camps for 38 years sees some subtle changes in the men and their work styles.

"People just don't work hard like they used to. You never used to see loggers runnin' around with pot bellies — they'd work 'em off. I bet I could keep up with those young chokermen. They might move a little quicker, but in the long run I'd come up even. In the old days, you'd run up a sweat just stompin' on the pedals in those old friction rigs; today they press buttons.

"The men haven't really changed that much; they still brag all week about their women, and brag to their women all weekend about how tough



Some men come to the camps to get away from their troubles. It is a sort of French Foreign Legion, replete with laughter, a touch of danger, and practical jokes in the evenings.



they are on the job. Woods foremen have changed, though. They're all going to Vancouver for this psychology training. Before when I'd see one, I'd expect a blast — they could always find something. Now he comes up and says 'You're doing great,' or 'That looks pretty good.' I'm still not used to it."

The woods foreman is in charge of activity in the woods, and the camp superintendent is the man in charge of the entire operation. Their authority notwithstanding, the most important man in camp is usually the cook, who more often than not works for a catering service. For men who work long days in the woods, meals take on great importance. It is a pressure job for the cook. He must keep the men happy to keep camp management happy, and he must somehow make a profit on a tight budget.

Andy Huschling, cook at Wakeman Sound, has been at it for 24 years. He works for the Domco catering company; he puts in a 14-hour day that starts at 3:30 a.m. "You have to get to know them all. You have to mother them a little. They're away from home, and a smile is a big help. It's bad to get up at 5:30, walk into the cookhouse, and run into a grouchy cook."

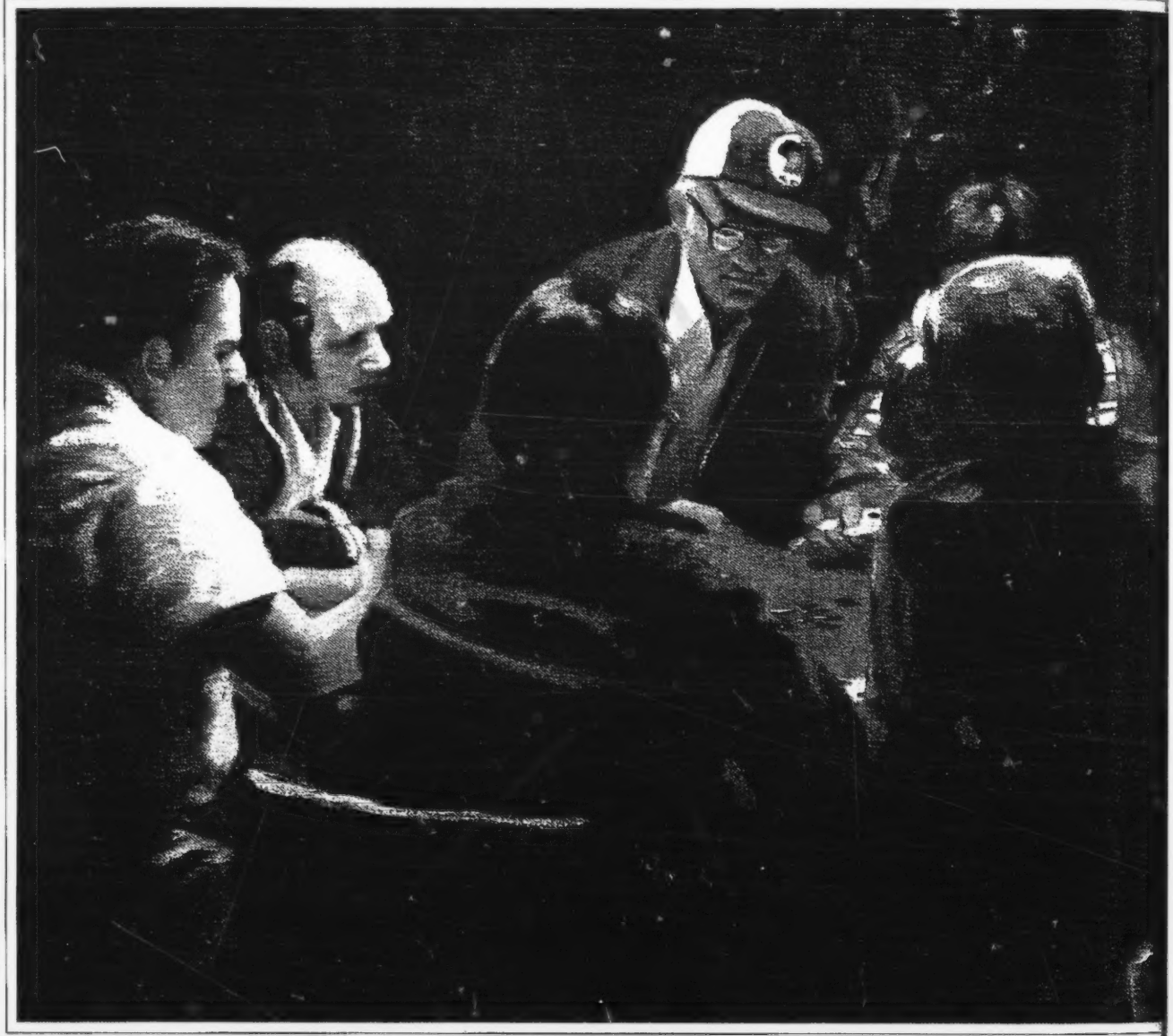
Camp loggers eat better in cookhouses than they would elsewhere. One menu, chalked on a blackboard at a Vancouver Island camp, offered steak, deep-fried prawns, lasagna, and other dishes, along with a choice of a dozen salads, appetizers, and desserts, including an elegant pie with sky-high meringue. "I can't afford to eat that well at home," says one logger.

"The boys are not fancy eaters," says Andy Huschling. Lucien Belanger agrees. "Construction camp people are more sophisticated eaters." It seems the worst thing that could happen would be for the cook to run out of fresh milk. One camp brings it in on a special charter plane.

After supper, there's relaxation in the bunkhouse or Rec Hall, which usually includes pool tables and other diversions like ping pong, shuffleboard, darts, or badminton. There is usually a TV room; hockey is the odds-on favorite for camps with live TV. Some pick up a couple of channels from repeater stations along Vancouver Island; still others, the fortunate few, have satellite receivers that bring in as many channels as you can stand — movie channels, 24-hour sports channels, and stations as far away as Chicago. "Better than downtown," says one camp dweller. Other camps make do with videotapes mailed around a circuit of camps and played back through a tape machine.

At many camps there are specified beer nights — usually three a week, held in the Rec Hall under the auspices of the camp social club. Undue rowdiness is penalized by a reduction in the number of nights — an effective sanction, because nobody wants to face the group after causing a lost night. There are some on-the-job hangovers, but good times rarely interfere with work. "Nobody misses work," says one timekeeper.

Are there drugs in camp? No doubt. There were several drug busts not long ago at a Vancouver Island camp, and many men lost their jobs. "Sent 'em out by the boatload," says the accountant. "They cleaned out the Zoo." This raises another important point: camps are largely self-policing, and the superintendent's word is law.



Police are only called in on extreme cases, which are rare. The threat of loss of one's job is a strong deterrent to unruly loggers. Jobs are scarce, and awarded mostly by referral.

"We don't go through hiring halls," says Vic Kloster, woods foreman at Bedingfield. "We put out the word that we have an opening, and ask our boys if they know of someone. They usually won't recommend somebody unless they think he's OK."

Money is not the only reason camp jobs are sought after. "It's beautiful," says Sue Atkinson. "I've stood over at the water's edge and watched the eagles scream and dive at each other."

Sue and her husband Brian came to Wakeman Sound from Chilliwack. They live in a comfortable mobile home, supplied and furnished by BCFP. It is their first experience with remote camps. Today Sue is teaching her son Jamie with the help of a Dr. Seuss book. Jamie repeats the names of objects in the book as she points: "Clock?" "Clock." "Bird?" "Bird." "Phone?" His face goes blank. The only telephone in town is the radio-telephone in the operations shack, and Jamie has never seen it.

Sue Atkinson, who likes the camp atmosphere, copes with the abundance of leisure time like most of the camp wives. She writes letters, reads prodigiously, acquires hobbies, puts herself on junk-mail lists, and wishes occasionally that the camp received more than two channels on television.

Down at Bedingfield Camp in Bedwell Sound, Penny Davis has only the occasional videotape replay to watch, but she does get to shop every Thursday in Tofino. Then there are those occasional sprees in Vancouver when she makes up for the inaccessibility of department stores in camp. An oil painting, displaying a delicate touch, hangs near the door of her mobile home; it was done by her husband, a bullbucker.

For children, camp is an unusual existence. "It was a great place to raise kids," says one Cowichan Valley mother. Some camps have a one-room school oper-

The men in any camp are a mix of crusty old-timers and rowdy young bucks anxious to prove their manhood, with all the variations in between, including irrepressible extroverts for whom camplife is ideal.

ated by the nearest school district, and fully equipped with videotape equipment and libraries. Others send children to school by boat or plane. One Vancouver Island teenager joins four other children for a 6:30 boat ride to another camp; from there he takes another boat to Tofino. He then rides another 30 miles to the high school in Ucluelet. The alternative is correspondence classes, legal for students in remote areas, but not always desirable.

As remote camps go, Pat Carson's three-year-old Bedingfield camp might be viewed as a deluxe example. Carson and his engineer laid it out to give everyone a view; the bunkhouses are arranged in tiers up the hill and there are sheltered steps that let the single men walk down to the cookhouse and Rec Hall without getting drenched. Most camps become a sea of mud in the rain; Carson has spread crushed rock everywhere, and is bringing in plants to landscape the site. These may seem like modest improvements, but they can mean a great deal psychologically. The next project here will be an indoor pool, but no matter how comfortable any camp is, it is never really home.

The "downtown" camps are different. Every workday evening crummies carry home the loggers to homes an hour away; they spend the evening with their families. Canadian Forest Products' logging communities in Vancouver Island's Nimpkish Valley are more like real towns, with permanent houses and access to the Island Highway. Even Vernon Lake, which is about 25 miles more remote than Woss Camp, has permanent houses and the feeling of a lasting settlement. It does not have the sense of isolation that a remote cove has — although its children are bused to Gold River for school. But it is still a logging camp, as is Woss, with its divisional offices, gas station, restaurant, and private store.

Eleven in the morning on Wakeman Sound, and the operations shack is busy with the activity of shutdown. As a bonus for a good safety performance superintendent Bob Murrants is giving the men the afternoon off. A clutch of floatplanes will soon be here to take them away.

"This is a great camp," says a logger known as Whirlaway. "Steelhead. Salmon. An eleven-year-old hauled in a big Spring right off the floats. We had two pairs of grizzly triplets in camp last year."

The young men drift in to take away their separation papers. They're dressed for town — hardly recognizable as the men who splashed through the mud to the crummies at 6:30 that morning. They wisecrack in fluent Anglo-Saxon and stroll away.

The woods foreman's wife checks the mailbox; there are two company memos and a copy of *TV Guide*. She gives a message to the camp accountant: "Don't forget to tell Lance that Jean will pick up the kids at the airport." There is some discussion of how they will transport the dog, the gerbils, and the guinea pigs.

Two more men come in to pick up their papers. They're talking about where they will go during shutdown, and Las Vegas is mentioned. Outside a big-game guide and his American client stroll by. Talk turns to the world-record male grizzly shot here last year.

The room goes quiet. A rigging-crew worker is flipping through the union newsletter. He pauses to ask his bullbucker, for the third time, if he has checked that their flight is on the way.

For a moment the talk turns serious. "Fourteen thousand in federal taxes last year," says a logger, "and what are they doing for me up here? I can't see a thing." There are grunts of assent all around.

A visitor is reading aloud from the camp first aid record: "Running down log, slipped off and landed in hole." Silence. "While bucking a windfall, worker was struck by a chunk he never saw coming." Laughter.

This time, Sue Atkinson and her husband will stay. It is a three-week shutdown, and they will water their neighbours' house plants and keep an eye on things. They won't be entirely alone; the shop foreman will stay, and a handful of other people. It will be quiet here. A nice place to get away from it all.

From Forest To Rangelands

by Gary and Judy Green

The eastern slopes of the Coast and Cascade Mountain Ranges evolve into the gentle rolling hills of the central B.C. plateau. This is the Montane Forest Zone, home to the interior Douglas fir and pondorosa pine.

Here, unique rangeland plant communities live a somewhat tenuous existence, lacking the abundance of moisture of the western mountain slopes. Sage brush, bitter root, and prickly pear cactus are well adapted to survival in these dry conditions.

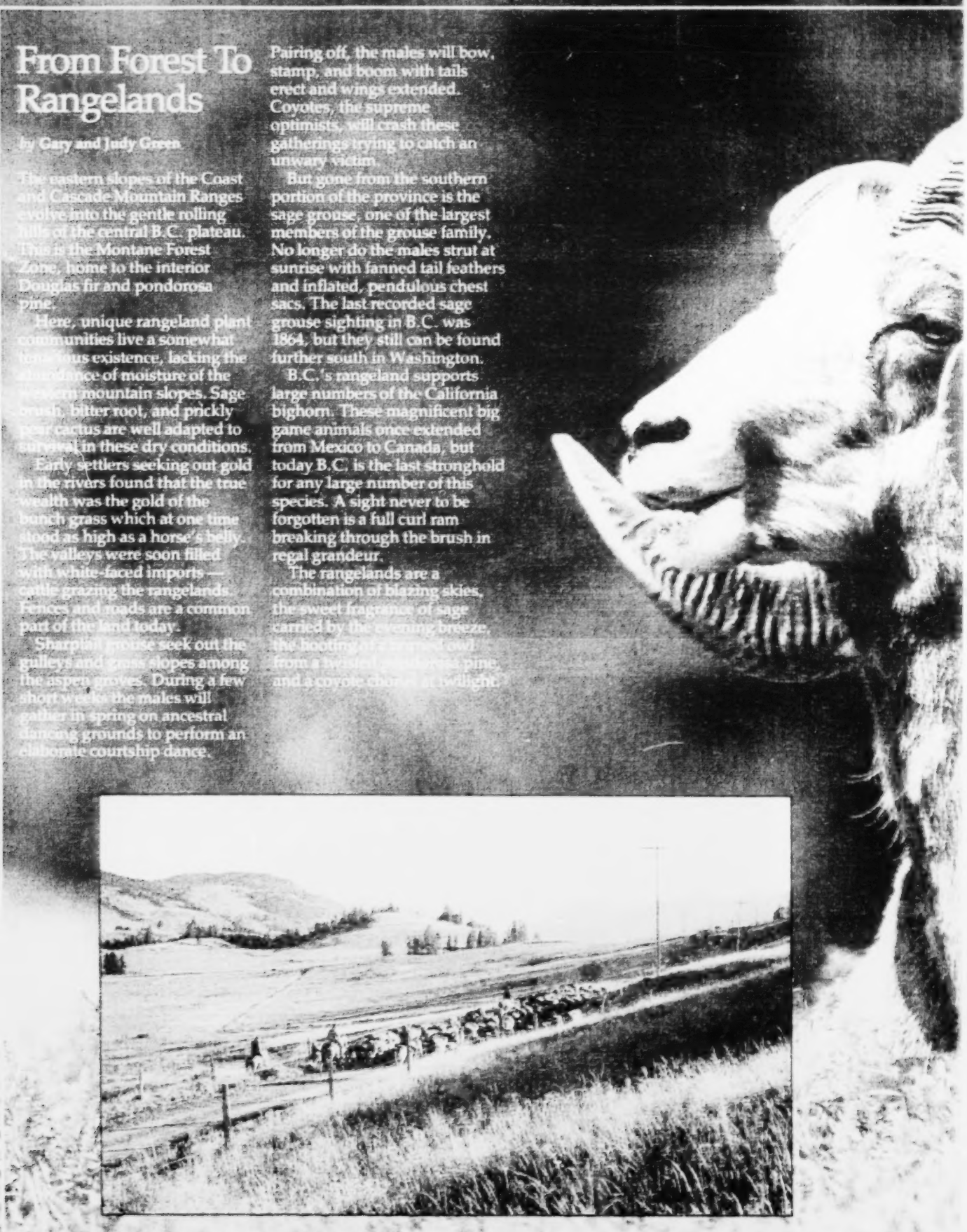
Early settlers seeking out gold in the rivers found that the true wealth was the gold of the bunch grass which at one time stood as high as a horse's belly. The valleys were soon filled with white-faced imports — cattle grazing the rangelands. Fences and roads are a common part of the land today.

Sharptail grouse seek out the gullies and grass slopes among the aspen groves. During a few short weeks the males will gather in spring on ancestral dancing grounds to perform an elaborate courtship dance. Pairing off, the males will bow, stamp, and boom with tails erect and wings extended. Coyotes, the supreme optimists, will crash these gatherings trying to catch an unwary victim.

But gone from the southern portion of the province is the sage grouse, one of the largest members of the grouse family. No longer do the males strut at sunrise with fanned tail feathers and inflated, pendulous chest sacs. The last recorded sage grouse sighting in B.C. was 1864, but they still can be found further south in Washington.

B.C.'s rangeland supports large numbers of the California bighorn. These magnificent big game animals once extended from Mexico to Canada, but today B.C. is the last stronghold for any large number of this species. A sight never to be forgotten is a full curl ram breaking through the brush in regal grandeur.

The rangelands are a combination of blazing skies, the sweet fragrance of sage carried by the evening breeze, the hooting of a [illegible] owl from a twisted [illegible] pine, and a coyote chorus at twilight.



sage grouse (Washington)

Hamish Kimmins

by **Gord Price**

Dr. James P. Kimmins reaches every student who goes through British Columbia's only professional forestry program. So people tend to pay attention when he starts telling them that forestry education in B.C. today is falling far short of what's required.

Kimmins is best known in the academic world for his work in nutrient cycling and for his development of a computer simulation model known as FORCYTE, which can predict forest productivity given different levels of forest management. To all second-year students in the forestry faculty of the University of British Columbia, however, he's better known as their instructor of forest ecology.

Despite all evidence to the contrary — red beard, accent, a sturdy build and a nickname of "Hamish" — Kimmins in fact is not a Scot. Born in the Middle East, raised in England, a graduate of Berkeley and Yale, he is by his own definition a Canadian, specifically of the west coast persuasion.

First fascinated by plants as a teenager through long walks in the woods, Kimmins happened on a book about the English woodlands and began to work on a private estate containing its own forest. This led eventually to a forestry degree at the University of Wales. He then went on to specialize in forest entomology — the study of insects — and animal ecology. "But I realized it wasn't just the animals that fascinated me — it was the whole forest ecosystem. That brought me full circle back into forestry."

Today, given the great number of foresters required to enable government and industry to get on with the job of intensive forest management, Kimmins fears that forestry education in B.C. isn't being given the priority it deserves.

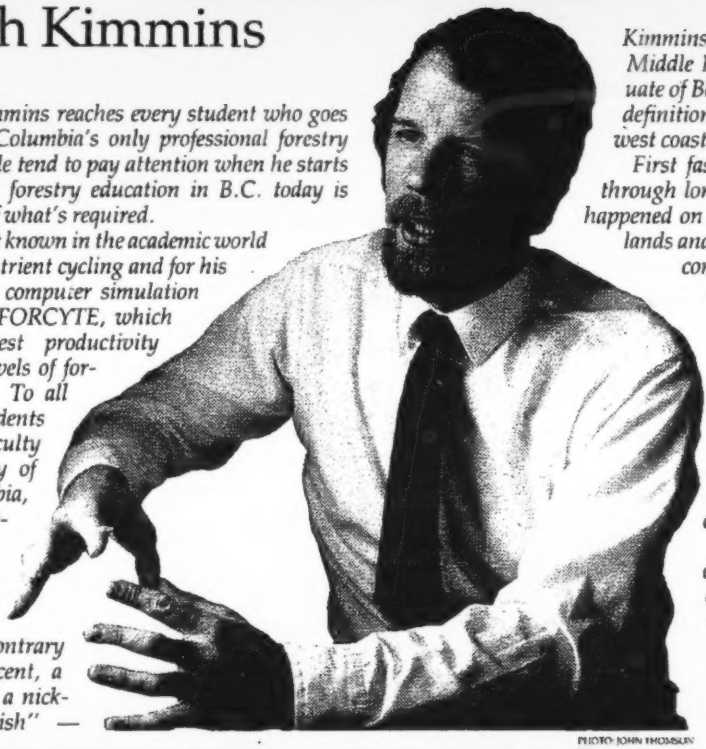


PHOTO: JOHN THOMSON

FORESTALK: The man in charge of the Canadian Forestry Service, Les Reed, (see ForesTalk Interview Winter 1979), recently warned British Columbians that there's going to be a significant lack of foresters in the future. Do you share that opinion?

KIMMINS: Yes, for two reasons. First, as we enter the era of intensive forest management, we are going to need a substantial increase in the number of professional foresters. When you are merely exploiting a timber resource, you need good engineers to build good roads and to supervise the harvesting, and enough foresters to organize the protection of the forests and the collection of royalties. The manpower requirements of replacing that timber, of establishing and then tending the young crop through to maturity, are very much greater. It was suggested recently that to staff the necessary expansion of intensive forestry in Canada we will need 8,000 graduate foresters over the next 10 years.

Secondly, there was a large influx of foresters into the province in the immediate post-war period, a time when the U.B.C. forestry faculty had some of its largest classes ever. Many of these foresters are now approaching retirement and will have to be replaced.

FOESTALK: Can we not solve that problem by importing foresters from other places?

KIMMINS: Yes, there is that possibility, particularly from the U.S. where there is a great overproduction of forestry students. In B.C. we have depended traditionally on New Brunswick, Ontario, Quebec and Alberta forestry schools to help fill the demand for graduate foresters. On the average, however, it is better to have a person with local education and field experience.

"Intensively managed forests will require twice as many foresters. Without this added manpower, the urgently needed improvement in forest productivity is not likely to occur."

FORESTALK: How serious will the forester shortage be?

KIMMINS: It will become very significant, but I don't think that's apparent to most people yet. If there is an expansion of intensive forestry in the next two decades — as the politicians have repeatedly promised — we will find it increasingly hard to find qualified people to fill the jobs. There will come a time in the next few years when there may be limitations on program development for lack of appropriately qualified people. In intensively managed forests the amount of land each forester manages should be decreased by a half or more. This will require at least twice as many foresters. Unless we have this added manpower, the urgently needed improvement in forest productivity is not likely to occur.

FORESTALK: But we may not realize it.

KIMMINS: No. The public won't notice it. The mountains will look green whether we increase the number of foresters or not. But what will differ will be the number of trees, the speed at which they are growing, the volume of logs that can be taken annually from the forest, and our ability to deal with fire, diseases and insects.

FORESTALK: How will B.C.'s educational institutions solve this problem?

KIMMINS: You have two types of forest managers: the technical field forester who is responsible for supervising forestry work in the field on a daily basis, and the professional who is more involved in planning and organizing the work. There are several technical forestry programs in the province, but we only have U.B.C. producing professional foresters. I suspect the problem of lack of

manpower will be most severe at the professional level.

The difficulty with our U.B.C. program is that we are extremely limited in our ability to expand, given our present level of staffing and our present facilities. Right now we are undergoing a very significant increase in undergraduate enrolment that is putting very severe strains on our supply of space. Classes are becoming too big; students are suffering because they are not getting the hands-on kind of education that a professional needs. And there is no immediate relief in sight.

FORESTALK: So the problem isn't the numbers who are interested, but your ability to train them.

KIMMINS: That's right. We are incredibly short of space; we don't have enough offices to adequately house the teaching staff. Until we get more room we can't expand our teaching faculty. We have virtually no space for research personnel and almost no laboratory space, which places an absolute limit on how much research we can do. It is also extremely difficult to hire somebody to fill a teaching position at a faculty of forestry anywhere in Canada. There is such a shortage of qualified teachers that very often a position will remain empty for years.

FORESTALK: This couldn't have occurred overnight. Where were the university's priorities as the problem developed?

KIMMINS: For most people in the province, forestry is logging; building up teaching and research facilities at U.B.C. has not been considered very important. In spite of past expansions, today the forestry faculty is understaffed and has a serious lack of building space. Only recently have these deficiencies begun to receive professional and public recognition. Even today, few people realize what a predicament we're in. And if you go 20 years without facing up to your problems, you have a 20-year problem which cannot be solved overnight.

FORESTALK: Well, since we have a 20-year problem on our hands, how are we going to solve it?

KIMMINS: Surely in a province like B.C. where over half the economy is generated by forestry, there is a special case to be made for forestry teaching and research. By comparison, agriculture, U.B.C.'s other major renewable resource faculty, has seven times more total space on campus than has the forestry faculty, twice as much undergraduate teaching space per student, and more than twice the total teaching, research and support staff.

U.B.C. should be proud of its excellent faculty of agriculture, but while new building space for both agriculture and forestry is being planned, it appears that forestry's position relative to agriculture will be maintained. To me it is quite clear that forestry at U.B.C. needs to be as large as agriculture, if not substantially larger.

FORESTALK: Why is that not the case today?

KIMMINS: Because agriculture is a much older profession. Forestry is a younger science; it doesn't have agriculture's history and tradition of teaching and research. As a result, U.B.C. has not allocated the resources to forestry to do the necessary job. But unless there is a recognition of the important role professional education must play in solving our problems, it is difficult to see how things can improve.

FORESTALK: Today in B.C. we're in that transition period you described earlier: moving from merely exploiting our forests to managing them. Generally, aren't you seeing decisions being made where forestry is being assigned a higher priority?

"For most people, forestry is logging; building up teaching and research facilities at U.B.C. has not been considered very important. Even today, few realize the predicament we're in."

KIMMINS: There is increasing talk among politicians and other decision makers about the urgency and need for this to be done. I don't see it translated into action yet, although there has been a marked increase in activity by government and industry to increase forest research, which will put more pressure on forestry education. Forest practices certainly have improved over the past decade, but there is still a great need for more improvement. I'm not yet convinced that people realize the seriousness of the problem this province will face if we don't get on with solving our forestry problems.

FORESTALK: What will it take to make them realize it?

KIMMINS: We're all human; we all react to crisis. It will take significant reductions in timber yields in some parts of the province; mills closing, people being thrown out of work. I really think that is the kind of thing that will be required — unfortunately — to make people conscious of the urgent forestry needs in this province.

FORESTALK: What contribution does the forest industry make directly to the education of B.C. foresters?

KIMMINS: There are several very useful fellowships from industry in support of graduate students, and several of our graduate students do their field research in close cooperation with industry. In fact it would be much harder to run our graduate program — we couldn't support the students — without these industry contributions.

But there is no significant large-scale contribution from industry in support of the U.B.C. Research Forest, no support for developing interior research forests, no support in terms of funding new buildings, of funding teaching positions, or of supplying equipment; none of that. Perhaps the problem is simply that we haven't asked for these contributions, but it would seem wise for industry to invest in providing the best possible education for their future employees.

However, I mustn't underrate the contribution of B.C. forest products companies; they are always extremely generous if we ask to go on their land. And you have to remember that industry's prime concern is creating capital. They're not in it for any other reason. We mustn't kid ourselves about that. But personally I feel that they are being a little bit shortsighted. They should organize a joint program with government and U.B.C. to try to produce a significant improvement in our forestry education program.

FORESTALK: Finally, what about the university's own attitude towards forestry? Can you see a change occurring?

KIMMINS: Yes, I do perceive a sympathy in the university administration for the importance of forestry. We are being given generally favourable consideration in our future expansion, but I am not convinced that there is widespread recognition either of our present difficult situation or of the fact that in the long run it is forestry that makes the biggest single contribution to the tax dollars that fund U.B.C.

Recently we decided we should create a centre of excellence for silviculture here at U.B.C. So we applied for, and got, some additional funds to bring in a junior staff member on a two-year position to help with the teaching of silviculture and to expand that program. But there is no promise that there is going to be any continuation of that position. That position, and another in silvics which presently involves the freely contributed time of a highly qualified Ministry of Forests forester, should be fully funded so the university can show that it is really serious about silviculture in British Columbia.

Overall, U.B.C. should make a major commitment to forestry to ensure that an adequate supply of well educated foresters is available to this province's major industry.

COLLECTIONS

THE LEAVES

Before they fall in autumn, the leaves of hardwoods flare into a profusion of colours. Their quick procession from green to yellow and red ends on the ground, brown as the earth. They are equally full of change on the inside; here, the leaf is a power-generating plant, turning sunlight into sugar through the process of photosynthesis with an efficiency no human technology can approach. The leaves on a big tree may add up to over 140 square miles of surface area, all soaking up light energy. The green of the leaf comes from the pigment in chlorophyll, the still mysterious transformer of the energy in sunlight.

As summer shades into autumn, sunlight grows weaker and the leaves' photosynthesis generators slow to a halt. The fading of green chlorophyll allows the leaves' other pigments to show their colours. Yellow is the commonest; another is a group of anthocyanins, ranging from pink through purple to blue. It's not the frost but the sun that stimulates these pigments, tinging the dying leaves' edges with brilliant colours.

PETER Z. CAVERHILL (1884-1935)

CHIEF FORESTER 1920 - 1935

A solemn crowd had assembled under grey December skies to attend the funeral of B.C.'s third Chief Forester, Peter Z. Caverhill. Present were acting Premier and Minister of Lands A. Wells Gray, all the Victoria members of the Department of Lands and representatives from all other government departments, as well as members from forestry associations and lumber trade groups.

Of Peter Caverhill, Wells Gray stated that he "was esteemed both in his private capacity as a friend and counsellor, and also by reason of his high technical qualifications, making him supreme in his chosen calling, forestry."

Caverhill was well known and admired during his tenure as Chief Forester from 1920 to 1935, but very little is known about his personal life. A native of New Brunswick, he was a member of the University of New Brunswick's first graduating class in forestry in 1910. He later returned for a master's degree in 1917. Joining the B.C. Forest Branch at its inception in July 1912, Caverhill held a number of positions before succeeding Martin Grainger as Chief Forester in 1920. These were difficult times for the Forest Branch, as its ranks had been seriously depleted by World War I, and the Great Depression followed all too soon.

It was shortly after returning from the 1935 British Empire Forestry Conference at Durban, South Africa, that he died of a heart attack in his Victoria home. Caverhill's term as Chief Forester had spanned two-thirds of the life of the Forest Branch, and his loss was felt deeply.

Before Carving the TOTEM

In traditional Northwest Indian cultures the search for a suitable totem tree took place along the banks of rivers and lakes. There were two practical reasons for this; the trees could be judged from a distance and the one finally selected could be transported home by water.

After a cedar tree was chosen a test was performed to determine if its heart was sound. The faller would cut a plug from the heart of a yew tree and keep this plug in the right side of his mouth as he drilled out the heart of the cedar. The yew and cedar, both sacred plants, were considered to have once been beings and to still contain related "souls." The yew in the faller's mouth could echo to the true heart of its cedar "brother" and tell of its soundness.

The chief, for whom the totem was being carved, would then come to give his approval and perform the needed ceremonies, asking the spirit of the cedar not to feel angry.

The tree was then felled, trimmed and peeled with wooden, stone and bone tools.

THE WORLD TREE

Who hasn't heard the story of Jack and the Beanstalk? The plant Jack climbed into the sky to fight the giant is an echo of an old Nordic myth. In a land of fabulous legends, one of the Norsemen's most colourful beliefs concerned Yggdrasil (IG-dru-sil), the ash tree that spread over the whole world and supported the heavens. This "world tree" includes, in some legends, roots which reach down into the three worlds of men, gods and giants; its branches harbour all manner of birds and animals — including serpents that gnaw away at the tree and slowly destroy it. Hidden in the world tree's name is a reference to the bloody custom of some Nordic tribes of sacrificing victims to the gods by hanging them from the branch of a sacred tree. The gods, they believed, visited the tree every day to pass judgment on the affairs of men. Traces of the belief in a "world tree" linger in some old Danish and German churches, designed with a huge central mast supporting the whole structure.

HISTORICAL LOG

Canadians have long been stuck with the label of "hewers of wood and drawers of water." So forestry must be our oldest industry, right?

Wrong. The fur trade and the Atlantic fisheries operated for a good 250 years before logging got its start in the eastern provinces. While small local industries had been producing oak staves, potash and lumber since the times of early settlement, it was only towards the turn of the 19th century that the forest industry really came into its own.

Canada's timber industry owes its beginnings to 19th century Britain's once huge and powerful navy. By 1800 the once extensive forests of England had shrunk to some carefully protected reserves; her other sources of supply, the countries surrounding the Baltic Sea, were unreliable owing to Napoleon's naval activities. So Britain began to look further afield for wood to build her fighting ships — especially for thick white pine timbers for tall sailing masts and sturdy oak for ships' hulls. Conveniently, the New World provinces of New Brunswick, Nova Scotia and Canada held vast virgin forests close to tidewater. The Maritime provinces, especially New Brunswick, soon became Britain's chief supplier of ships' timbers. They also developed their own shipbuilding industry on the side. And it was a spectacularly fast-growing industry: Between 1803 and 1811 Britain's timber imports from her colonies grew from 10,000 to 175,000 shiploads, much of which was supplied by New Brunswick.

The New Pesticides

Man has new allies in the battle against the hundreds of pests that threaten every kind of plant life from Christmas tree farms to the backyard vegetable patch. Derived from plant and animal oils, these "soap" pesticides are being developed at the Pacific Forest Research Centre in Victoria by Dr. George Puritch. Unlike pesticides made from petrochemicals, each soap kills just one specific kind of pest, so they're much safer to use. Puritch's discoveries have already found many uses: one is combating the algae that creep into shelterhouses in Ministry of Forests' nurseries; another kills the balsam woolly aphid in North Carolina fir forests. And, mixed with small doses of methoxychlor, a petrochemical insecticide, another soap compound is effective against the winter moth which is now epidemic in parts of B.C.

A lot of homeowners and gardeners have already twigged to the usefulness of these "soap" pesticides, which are not the same soaps we use in the laundry room. "Soap" is the name for the class of fatty acid salts, and includes thousands of organic chemicals. As for their potential use against huge infestations such as the spruce budworm, Puritch says it will take a lot more research to develop an effective compound, not to mention the technology for proper application. Meanwhile a Victoria company, Safer Agro-Chem, is marketing some of Dr. Puritch's soap pesticide discoveries — and some new ones of their own.

PLEACHING

Tired of the shapes of your shrubbery? Then you might be ready for pleaching. This centuries-old craft uses tree grafting to create amazing effects: trees that are ladders, trees like entwining cables, trees with trunks laced into curlicues. There's a small forest of 48 pleached trees on a half-acre in Scott's Valley, California, the hobby for years of farmer Axel Erlandson. A number of English and French estates dating from the 18th century and earlier have gardens of pleached trees (the word is of French origin, from a word meaning to braid or weave), but the only other collection in North America is at the governor's palace in colonial Williamsburg, Virginia. Like the European arboriculturists of the age of elegance, Erlandson made his living curiosities by forcing branches into a mould and joining them to the exposed cambium of another branch. If, after a time of tight bandaging, the graft set, he removed the mould and the tree continued to grow in its new shape. Now that Erlandson is gone, however, his so-called Tree Circus has been threatened by neglect and urban development. It's not certain whether these relics of an almost-vanished craft will find a new home.

BEFORE MATCHES

What do ancient Egyptians, Inuit, and boy scouts have in common? They all light fires with drills. Long before the safety match came along, people were twirling wooden sticks in notched blocks, or 'hearths,' to create enough friction to start a tiny flame. With the right kind of wood, the powder created by drilling would ignite by itself; the Northwest Coast Indians often arranged bits of frayed cedar bark around the drill to catch the spark. The Inuit people made a labour-saving improvement: they wound a thong around the drill shaft and attached the ends of the thong to a small bow, which they moved back and forth by hand, considerably increasing the effect of the drill.

PHOTO E.S. CURTIS B.C. Provincial Archives

JUNGLES AFLAME

Twenty to forty million hectares of tropical forest are lost each year due to fires deliberately set. Who's responsible? Peasant farmers. They burn patches of forest to provide grazing land for their livestock or to plant crops and, when the soil is exhausted, burn another forest patch. This practice of shifting agriculture may have created the Sahara desert out of a huge North African forest, and the same fate may be in store for much of the remaining forest land in Africa, Southeast Asia and Latin America. Crude agriculture is the biggest cause of worldwide deforestation and is practised by more than 200 million people caught in the vicious circle of ignorance and poverty. The only solution is to make the land yield both fuel and food on a sustained basis, as modern agriculture has succeeded in doing. Agencies such as Canada's International Development Research Centre are hard at work promoting such concepts as agroforestry: planting trees and food crops together to boost the yields of both (the forest cover protects the fragile soil from erosion). But time is running out. The present rate of tropical deforestation is now recognized as a crisis equal to that of the energy problem.

Do you know any interesting facts about forests? Mail submissions to: ForesTalk — Collections, Information Services Branch, Ministry of Forests, 1450 Government St., Victoria, B.C. V8W 3E7. Information should be brief, accurate, and sources included where possible.

THE PIECES OF THE PUZZLE

by **Peter Grant**

There's an intricate puzzle in the Okanagan that foresters from industry and government are racing to piece together. It's the puzzle of silviculture, and there won't be a second chance to get it right. This special report takes a detailed look at how the final picture is taking shape.

Even given the fact that Vernon is orchard country, the rows of little spruce trees at the Ministry of Forests tree breeding arboretum off Highway 97 look unusual. Called "ramets," they're really twigs from full-grown trees grafted onto rootstock. Researcher Gyula Kiss points out that these ramets represent some of the best genetic material available from spruce forests in B.C. and eastern North America.

Derived from trees selected in wild stands for their outstanding growth and resistence to disease, most of the ramets are only a few years old yet are sagging with the weight of their cones; it's these seed cones that Kiss needs for his tree improvement work. His aim is to produce trees that grow even faster than his already selected stock, and seed from these improved trees eventually will provide seedlings for future spruce reforestation projects throughout the province, including the Okanagan.

On a hilltop a few kilometres north of Vernon, Weyerhaeuser Canada's new tree nursery is sprouting its first crop of seedlings. Workmen are still putting the finishing touches on the centre's buildings, which include cold storage facilities for holding seedlings until the forest sites they're intended for are ready to be planted.

In Kelowna, the Okanagan's hub city, Howie Carter pores over a cooperative Ministry of Forests-industry study on the future of forestry in the area. Carter is the forestry manager for Crown Zellerbach's interior division; the study is based on a computer program called "Multiple-Use Sustained Yield Calculation" (MUSYC) and was brought to B.C. by his company: "MUSYC has the ability to look at all forest types in the Okanagan and to choose the best management option for each one. It can also figure out the economics in each case." This is the first time MUSYC has been used for forestry planning in B.C.

In the Okanagan Timber Supply Area (TSA) — an area running south from the wet-belt forests around Shuswap Lake to the dry upcountry on either side of long, narrow Lake Okanagan — forestry has turned a corner. "We're not pioneers any more — we're tree farmers," says Rod Pringle, woodlands manager with Riverside Forest Products in Lumby, one of about 15 companies in the Okanagan cutting a combined total of close to 5 million cubic metres of wood a year. Pringle may be anticipating things a bit, but the industry in his part of the interior definitely is taking up the challenge of developing a full-scale silviculture program. Quite simply, it has to.

Without more silviculture, the present rate of harvesting in the Okanagan TSA can't be kept up much beyond 80 years. At that point the accessible old-growth spruce and Douglas fir forests will be depleted. Once loggers start working the smaller-volumed second growth, the result could be a reduction of as much as one-third of the current rate of harvest. So the industry's Allowable Annual Cut — the number of cubic metres of wood the companies can cut each year — will have to be reduced. This can be done gradually, to allow the Okanagan communities time to adjust to a lower level of forest-related employment; or all at once, 80 years from now.

This assessment comes from the 1979 Ministry of Forests' analysis of future timber yields from the Okanagan TSA. Similar yield analyses have been done for each of B.C.'s 33 Timber Supply Areas, the Ministry's newly-formed forestland planning units. A yield analysis sets out the current state of forestry in a given area — the first step towards developing a silvicultural program for the future.

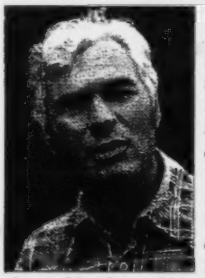
Why has the forest industry in the Okanagan reached such a critical point? In the past two decades, as the Ministry of Forests encouraged the efficient milling of smaller-dimension timber, two large firms — Crown Zellerbach and Weyerhaeuser — bought up cutting rights from smaller companies and expanded their mill capacity. During that time virtually every other company added to its mill capacity as well. Today there are several clusters of sawmills and three plywood plants in the

photography by **Doug Cowell**

In the area comprising the Okanagan Timber Supply Area, most noticeable are the lakes— beautiful and blue with sandy beaches and warm water. Osoyoos Lake, Skaha, 150-km-long Okanagan Lake, Kalamalka (the lake of many colours) and the many-armed Shuswap Lake pictured here. Much of the almost five million cubic metres of wood cut each year from the Okanagan TSA comes from the broad benchland above the Okanagan Valley itself, a forestland of dry-belt Douglas fir, lodgepole pine, spruce and balsam that most visitors — and many residents — aren't even aware of. Timber shortages, which would affect employment in urban centres like Kelowna (left), are forecast for the future unless essential forest management steps are taken today. These include planting improved tree varieties (above) such as those being developed by Ministry of Forests researcher Gyula Kiss (opposite page) at the Ministry's research operation near Vernon.

THE PUBLIC RESPONSE

What do the citizens of the Okanagan and Shuswap valleys think about the forestry puzzle of the Okanagan TSA? To find out, the Ministry of Forests' Kamloops regional office published an account of the TSA yield analysis, circulated a follow-up questionnaire and conducted public discussion groups on the topic. From all of that several common public concerns surfaced: Are the forests being overcut? Is the environment being managed properly? When will intensive forestry really come to the Okanagan TSA? As well, various local residents have been speaking out.



Tilman Nahm has a 10-acre orchard in Kelowna, now surrounded by new houses. As an avid snowmobiler and a director of the 1000-strong Kelowna Fish and Game Club, he speaks for the area's forest recreationists. They're alarmed by the rapid increase in logging in the valley's watershed, but Nahm is encouraged by the more cooperative attitude of the forest companies. He feels that education is a key to sound forest management: "It comes down to instructing every bulldozer operator on how to work around streams." Tilman Nahm also sits on the Greystokes Task Force, talking with industry foresters and other users of this favorite subalpine area near Kelowna about the best ways to develop it for everyone's benefit.

Up in Salmon Arm, Phil Cave voices the same doubts about the effects of clearcut logging in watersheds. A logger for many years with a small tie mill, and now an alderman in Salmon Arm, Cave's immediate concern is the Canoe Creek watershed — from which the town of Salmon Arm draws one-third of its water supply. With ski enthusiasts also wanting to protect 150 km of trails in the same area, Cave sees the need to start multiple-use forest planning.

Okanagan valley, and forestry is the region's biggest employer. To support this growth, logging operations have expanded into the spruce-pine-balsam forest in plateau country high up the valley sides.

This rapid expansion of the forest industry was only part of an influx of people and money in the 1960s and 1970s — a pace of development that far outstripped the rest of B.C.'s interior. The three main urban areas of Vernon, Kelowna and Penticton have expanded relentlessly into the surrounding orchardland and onto the dry hills. But these lowland communities, centres to large tourist and agriculture industries, need the water that comes from the forested watersheds in the plateau country. These same forests are very much in demand for recreation year-round.

The only solution to this strong competition for the use of dwindling forestlands is improved silviculture: growing better quality trees faster on a smaller land base. But can silviculture save the Okanagan?

It takes a huge amount of expertise, research and planning to make silviculture work. Where public funds and local expertise are limited, the situation is made even more difficult. That's why the pieces of the silvicultural puzzle in the Okanagan are just now starting to fit together.

FIRST, SOME MUSYC

The Ministry's yield analysis predicts a reduction in timber supplies 80 years from now, once most of the old-growth in the Okanagan TSA is liquidated. Although building on the data used in this yield analysis, the cooperative MUSYC study points to a brighter future for the forests of the Okanagan. While the Ministry analysis was based on current silviculture practices, the MUSYC study figured out a plan for an improved silvicultural program sufficient to grow enough wood to run the area's mills at capacity almost indefinitely.

Is the MUSYC computer program foolproof? This more intensive form of silviculture is so new to the interior that there is little data about the added growth in trees in managed stands, so no one can say for sure. But the computer model is now used by the U.S. Forest Service to manage millions of hectares of National Forest.

This sophisticated computer program originally was to be used by Crown Zellerbach to study its three Tree Farm Licences in the Okanagan. Thanks to its versatility, MUSYC instead became the basis for a cooperative planning process for the whole Okanagan TSA. This involved foresters from the Shuswap-Okanagan Forestry Association (SOFA) and from the Ministry's regional Kamloops office. Also, two planners from the Ministry's yield analysis program in Victoria worked together with Crown Zellerbach's computer scientists.

That cooperative spirit led to the creation of a joint industry-Ministry committee to plan the first comprehensive silvicultural program for the Okanagan. However, the decision on how much money the Ministry eventually will allocate for silviculture here is still pending; Ministry planners have a province-full of proposed forest management programs in need of funding. Obviously, Crown Zellerbach's MUSYC man Howie Carter hopes the Ministry goes for SOFA's computer-assisted plan.

The MUSYC analysis says the Okanagan TSA could support an allowable annual cut of 3.8 million cubic metres a year — up from its present level of 2.9 million cubic metres. (Tree Farm Licences and other forms of tenure make up the rest of the area's current total cut of nearly 5 million cubic metres). The plan calls for a four-fold increase in treeplanting (to 15 million a year) over the next 20 years. It also outlines a program for spacing young stands to make them grow faster, and a rehabilitation program of harvesting decadent cedar and hemlock and planting new seedlings on this productive land. Carter emphasizes that the additional silviculture costs to the Ministry would be recovered through the extra stumpage revenue it would get from the increased rate of harvest. "The program could be self-financing," he says.

NEEDED: MORE SEEDLINGS

"All sites in the Okanagan come back in wood eventually," says a forester. But "eventually" can mean 25 years, and the wood may be of an inferior species. Such regeneration delays can be avoided by planting seedlings immediately after logging; planted forests will provide wood for the mills 25 years sooner than natural regeneration.

The Ministry's Five-Year Forest Resource Program now sets a province-wide minimum standard for forest management: "basic" silviculture has to ensure that every clearcut site is restocked "within three to ten years, depending on the nature and the location of the land." Moreover, the timber licences issued by the province's six forest regions define for a company its "basic" management requirements.

In the Okanagan-Shuswap, as elsewhere, there are various reasons why silviculture hasn't yet reached that "basic" stage. Essentially, growing seedlings in nurseries for planting — the backbone of the program — is a complex science. It has taken the province's nursery experts 50 years to reach the present plateau of growing 90 million plantable seedlings a year;

Seen from the air the plateau country rising above Okanagan Lake is a patchwork quilt of clearcuts. This forestland, which is the basis of the area's forest industry, is very much in demand for recreation and is the watershed providing much-needed water to the large tourist, agriculture and orchard industries in the dry valley below. The only solution to this competition for forestland is improved silviculture: meeting the needs of the forest industry by growing better quality trees faster on a smaller land base.

Silvicultural planning for the Okanagan TSA is now a cooperative effort involving foresters from both the Ministry of Forests and the forest industry. Crown Zellerbach's forestry manager Howie Carter (inset, right) looks over data provided by a sophisticated forestry management computer program called MUSYC, which his company introduced into B.C. from the U.S. and now serves as the basis for forestry planning in the Okanagan.

Down in Summerland, Juergen Hansen, president of the Okanagan Similkameen Parks Society, is trying to have the whole Brent Mountain area dedicated as a provincial park. He is especially interested in protecting the fragile high-altitude tundra and the many varied plant communities along the timberline. (A recent government decision set aside nearly 3000 hectares as a Ministry of Forests recreation site, with controlled logging practices allowed outside the site.)
Katy Madsen also lives in Summerland; she has been a Sierra Club member since 1938. Madsen takes a critical view of forestry, wondering what heritage of forests the industry will leave her grandchildren. She wonders if clearcut harvesting will change the ecology of high-elevation sites, and if these might prove difficult to reforest. She laughs about a booklet she published in response to the yield analysis report. Called "The Ideal Forest," her broadside poked fun at the idea that the "ideal" forests of managed second growth will be better than the "actual" old growth people use and enjoy today. "Sometimes a sense of humour makes a point better than a technical report."

Kelowna architect John Woodworth asks similar questions about forestry — the result, he says, of flying over the area a lot and "prowling" the backwoods. As an outgrowth of regional planning studies at the University of British Columbia, Woodworth published a study entitled "Is Everything All Right Up There?" Clearcut openings in the plateau country may create flood-and-drought cycles, he claims, which will complicate the valley's water supplies. Woodworth also suggests that the Ministry is some time away from meeting its goal of prompt reforestation after logging. Meanwhile, he says the future yields from those young forests should not be overestimated.

that number is now being increased to 150 million. That's where Weyerhaeuser's nursery near Vernon comes into the puzzle. It's one of the first built by a forest company since the forest industry entered the nursery business two years ago, and initially it will supply five million seedlings a year to the southern interior.

WHAT GOES WRONG

Not enough seedlings to plant isn't the only missing piece in the Okanagan silvicultural puzzle. Those seedlings that have been planted have had problems surviving, and researchers with the Kamloops Forest Region are gradually learning the reasons for, and solutions to, these survival problems. In a study conducted several years ago, research officer Bruce Clark found that "roughly one-third of all plantations either are failures or are of doubtful potential two years following planting." There are a number of reasons for this.

In parts of the Okanagan the dry climate creates a threat to young trees. "In a moisture-deficient year we get high mortality," says Kamloops Region silviculture officer Jack Robinson. Ministry researchers are combatting the summer drought threat by developing a Planting Hazard Index — similar to the fire hazard rating system — that tells treeplanters when it's too dry to plant.

Also, widespread seedling mortality has resulted from the incompatibility of species to site. The Kamloops Region today is rapidly developing a field guide to help forest managers plant the right species on the right site, but this project requires considerable fieldwork. As well, nurseries have to grow different tree types to suit different planting needs. Spruce seedlings destined for high elevations, for example, need a thick girth just above the roots to withstand heavy snows.

With field data still to be collected on issues like this, the Okanagan TSA is a long way from planting seedlings custom-grown for every site. However, improved nursery techniques and the slow accumulation of knowledge about plantations continue to boost the rate of seedling survival. Kamloops Regional Manager Tony Robinson considers the present survival rate (about 75 percent two years after planting) to be "in an acceptable range," but expects this ratio to improve.

ENTER: INTENSIVE FORESTRY

If treeplanting is still in its youth in the Okanagan, intensive forestry is just a baby. Until recently there has been neither the information nor the incentive to undertake projects such as the thinning and fertilizing of young stands or the rehabilitation of potentially productive forestland. But because of recent Ministry of Forests incentives that award both decreases in stumpage fees and increases in yearly timber harvest to companies that undertake intensive forestry practices, today intensive forestry in the Okanagan is finally making some headway.

"At the moment, backlog reforestation and the rehabilitation of decadent cedar/hemlock stands tend to offer the highest return for money invested in intensive forestry," says Kamloops Region Forestry Manager Phil Van Mol. "Also, spacing the trees in dense lodgepole pine stands is another way to increase annual growth in the TSA."

THE LAST PIECE: TREE IMPROVEMENT

Genetically-improved trees are the hope of the future. Gyula Kiss's experimental ramets at the Ministry of Forests Vernon research station are the forebears of greatly improved planting stock that one day will reforest the best spruce forest sites throughout B.C. Also, a seed orchard is being developed on the site to help fill the need for good quality seed for current reforestation projects.

As with other aspects of silviculture that require a concentration of money and expertise, the Ministry has now combined forces with the forest industry in tree breeding activities. The goal set for 1995 by the newly formed industry-Ministry Interior Forest Improvement Board is to be growing 80 million interior spruce seedlings annually from orchard-produced seed.

THE COMPLETE PICTURE

The complete puzzle is not assembled yet, but the state of forestry to come in the Okanagan is definitely taking shape. Privately-run nurseries and computer-assisted forestry planning means forestry is becoming a big-league business. But it's an expensive business — for both the industry and the Ministry — and more co-operative programs will have to develop. Research is the key to making all the pieces fit together. Meanwhile, the very look of the Okanagan's forests is changing as more and more forestland is being logged and reforested. In the next two decades the pace of harvesting will actually increase, forcing the level of forest management to leap ahead with it. It's still too soon to predict whether the Okanagan TSA will wind up with enough of the right kind of silviculture to offset a decline in timber supplies 80 years down the line, but the next yield analysis — scheduled for 1984 — should provide a much clearer picture.

Growing seedlings for treeplanting programs was once solely a Ministry of Forests responsibility. But in the past two years the forest industry has joined in, and this Weyerhaeuser nursery near Vernon was among the first to get underway. Initially it will supply five million seedlings annually to the southern interior.

Replanting a site immediately after it is logged is one silvicultural step that helps produce good-quality trees quickly. Officials from both the Ministry of Forests and the companies concerned check to see that treeplanting operations are done to standard (left).

Privately-run nurseries and computer-assisted forestry planning means forestry in the Okanagan TSA is becoming big business. But it's still too soon to predict whether the Okanagan will wind up with the right kind of silviculture to offset timber shortages in the future.

LETTERS

A Bailey Bridge to the South
I particularly enjoyed your "People" profile of Andy Bailey in the Winter 1980 issue of ForesTalk. It is articles like this that make one realize that British Columbia does not consist entirely of the lower mainland area. In fact, it is because of people like Andy Bailey that the lower mainland has so much prosperity.

Charles Latimer
Delta, B.C.

Sexy Wings
You have made a mistake on page 31 in the Winter 1980 issue of ForesTalk. The mistake is the picture of the "damselfly." That's not what it is. It's a dragonfly.

Donald Devries
Grade 3
Vancouver Christian School

You're right. As every nature photographer and ForesTalk editor should know, a dragonfly always keeps its wings extended. It's the damselfly that holds her wings flush against her body.

Snags Can Kill
The Winter 1980 issue of ForesTalk contained an article on falling timber ("In The Hands Of The Faller"), and in that article is a report of an interview with Mr. Wayne Funk on the subject of snags. The article implies that Mr. Funk leaves snags standing because of what he perceives to be a conflict between the forest managers who want the snags left to "maintain the biotic integrity of the forests" and the Workers' Compensation Board which "states that snags are dangerous and insists that all snags in working areas be felled."

I feel that your article should have made more clear the fact that snags *are* dangerous, have killed and maimed countless fallers and must be felled in accordance with WCB regulations. The Industrial Health and Safety Regulations of the WCB have been formed as a result of decades of experience in dealing with industrial operations in the province; to ignore these regulations is to greatly increase the risk of serious injury on the job.

G. McMillan
Director
Information Services Department
Workers' Compensation Board

MacMillan - A Yale Man
The biography of B.C.'s first Chief Forester ("Collections", ForesTalk Spring 1981) contains what I presume to be a misprint where it states that H.R. MacMillan received his Master of Forestry degree from York University. In fact he went to Yale University, as is correctly mentioned later in the article.

MacMillan entered Yale in the fall of 1906, at which time a university education in forestry was not available in Canada. The first forestry faculty in this country was established at the University of Toronto in 1907 and produced its first graduating class in 1909. Several other universities began to offer forestry instruction soon afterwards: the University of New Brunswick (1908), L'Université Laval (1910), and the University of British Columbia (1921). Six Canadian universities currently maintain forestry faculties.

J. Parminter
Victoria

Caribouquet
As a member of the Raft-North Thompson Steering Committee, I wish to congratulate ForesTalk for the excellent article by Diane Swanson in the Spring 1981 issue on the logging-caribou conflict in the North Thompson region. I found the article to be accurate and fair in presenting a complex problem. I am sure that it will help develop a better public understanding of the problem and the various trade-offs involved.

Wallce G. Macgregor
i/c Ungulate Management
Fish & Wildlife Branch
Ministry of Environment

Vancouver Rediscovered
The back page of the Spring 1981 issue of ForesTalk stated that Archibald Menzies, surgeon and botanist aboard Captain Cook's Discovery, reported the occurrence of Sitka spruce in 1792.

Cook's command on this coast was H.M.S. Resolution. He was killed by natives in the Sandwich Islands (Hawaii) in 1779. Midshipman George Vancouver was a member of the complement. Captain George Vancouver commanded Discovery on this coast in 1792.

Edmund Ball
Victoria, B.C.

Sorry. Our proofreading in this case was less than ship-shape.

Just Can't Wait
I would be grateful and delighted if you would kindly add my name to the mailing list for ForesTalk. You would save me a considerable burden of guilt for "borrowing" copies from waiting rooms!

Joanne Helwig
Penticton, B.C.

You meet some of the nicest periodicals in waiting rooms.

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ForesTalk's Guide To

HEATING WITH WOOD

As the price of heating homes with fossil fuels continues to climb, more and more people are turning to wood as a cheaper source of heat energy. Here's a guide to do-it-yourself heating you might find useful.

Gathering Wood

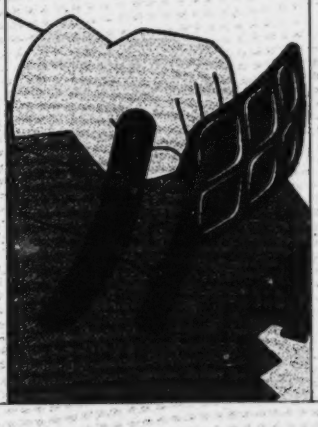
Finding it. The Ministry of Forests traditionally has provided the public with access to firewood on Crown land. To get this wood the firewood hunter must first apply for a **free use permit** at a Ministry district office. From there he will be directed either to a recent logging show where standing trees or piled slash are in need of clearing so the site can be planted, or to a **free use area,** or even to a Hydro right-of-way. He will also have to buck, split and haul his own wood. Likely, he will be limited to taking out a cord or two.

Because of a skyrocketing demand, free firewood from Crown land is in very short supply in many areas, especially around Vancouver and Victoria. If you live in the Vancouver area you may have to travel 100 kilometres or more to get to a free firewood cutting area. If you live in the lower Vancouver Island area you may have trouble acquiring firewood within a 50-kilometre radius. Further up-country you still may have to drive 30 kilometres to the nearest designated firewood-cutting area. (And remember to have your Forest District permit with you while you're cutting and hauling.)

Use of Proper Tools. Your chainsaw should be powerful enough for the size of wood you are cutting; the length of the bar should be at least equal to the average diameter of your logs. Chainbrakes, a recent innovation, are excellent safety devices and well worth paying extra for.

Professionals wear hardtoe boots, pants with fiberglass safety pads and hardhats. Do the same or be extra careful.

A full-size, single-bit splitting axe is essential. For larger wood, use a splitting maul or sledge hammer and wedges.

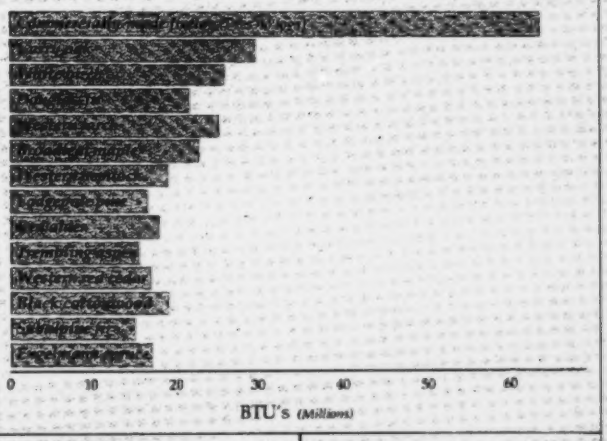


Tips on Buying Wood

All species of wood produce the same amount of heat per pound of dry wood, but some are heavier or denser than others. For example, a cord of dry birch provides 26,200,000 British Thermal Units (BTUs) of heat, while white pine only gives 18,600,000. A cord of oak, birch or Douglas fir is therefore worth more than the less dense alder or hemlock.

Heat Value of Wood

(Measured in millions of BTU's produced in burning one cord of air-dried wood with 20% moisture.)



Choosing the best firewoods. Douglas-fir is a good all-around fuel. If you cut it in the spring, it will probably be dried and ready to burn by winter.

Pine burns well, as do alder and birch. But cedar is light and fine-grained; it pops and snaps, and throws sparks. It's good for kindling, but burns too quickly to be your main source of fuel.

You can save a lot of time and energy by checking the wood you're going to cut. Mushy wood will burn after it's dried, but the fibre has rotted out, and the wood won't throw much heat. Pines and firs often contain pockets of pitch that burn with tremendous heat — they're excellent for kindling. Some softwoods (conifers) like fir and pine contain knots and burls that are so tight-grained they burn as well as any hardwood.

Above all, look for clean, sound wood that splinters crisply.

The traditional measure of firewood is the cord, a pile four feet high, four feet wide and eight feet long. But these days suppliers usually random-load wood. Half a cord of green wood taxes a three-quarter-ton pickup. A random-loaded cord is a small dump truck load. Compact pickups handle about one third of a cord.

Acquire firewood at least several months before you intend to use it and pile it out of the weather to dry. Insure that each round of wood is split at least once before piling to speed up drying. And make sure the wood length you buy fits your stove.

Artificial logs. There are two basic types. One consists of ground and compressed plywood trimmings. This is an excellent, economic fuel with a heat level close to that of hard coal. The second is paraffin wax soaked into sawdust. This type should never be used in wood stoves

ForesTalk's Guide To

HEATING WITH WOOD

As the price of heating homes with fossil fuels continues to climb, more and more people are turning to wood as a cheaper source of heat energy. Here's a guide to do-it-yourself heating you might find useful.

Gathering Wood

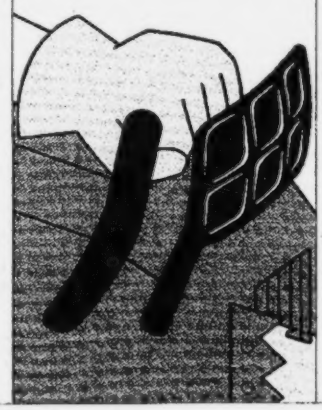
Finding it. The Ministry of Forests traditionally has provided the public with access to firewood on Crown land. To get this wood the firewood hunter must first apply for a **free use permit** at a Ministry district office. From there he will be directed either to a recent logging show where standing trees or piled slash are in need of clearing so the site can be planted, or to a **free use area,** or even to a Hydro right-of-way. He will also have to buck, split and haul his own wood. Likely, he will be limited to taking out a cord or two.

Because of a skyrocketing demand, free firewood from Crown land is in very short supply in many areas, especially around Vancouver and Victoria. If you live in the Vancouver area you may have to travel 100 kilometres or more to get to a free firewood cutting area. If you live in the lower Vancouver Island area you may have trouble acquiring firewood within a 50-kilometre radius. Further up-country you still may have to drive 30 kilometres to the nearest designated firewood-cutting area. (And remember to have your Forest District permit with you while you're cutting and hauling.)

Use of Proper Tools. Your chainsaw should be powerful enough for the size of wood you are cutting; the length of the bar should be at least equal to the average diameter of your logs. Chainbrakes, a recent innovation, are excellent safety devices and well worth paying extra for.

Professionals wear hardtoe boots, pants with fiberglass safety pads and hardhats. Do the same or be extra careful.

A full-size, single-bit splitting axe is essential. For larger wood, use a splitting maul or sledge hammer and wedges.



Tips on Buying Wood

All species of wood produce the same amount of heat per pound of dry wood, but some are heavier or denser than others. For example, a cord of dry birch provides 26,200,000 British Thermal Units (BTUs) of heat, while white pine only gives 18,600,000. A cord of oak, birch or Douglas fir is therefore worth more than the less dense alder or hemlock.

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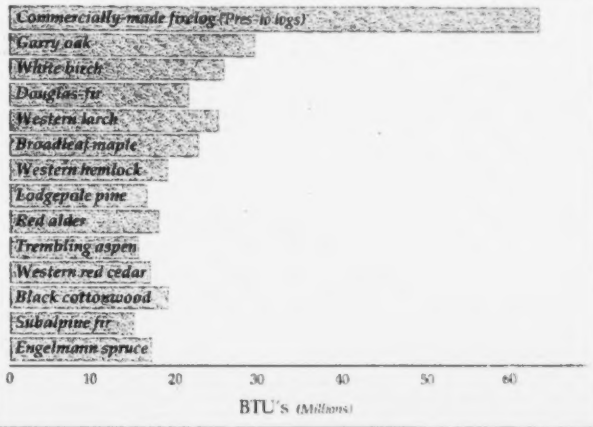

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as it burns at up to 2400°F, three times what most stoves are designed to handle.

Rolled newspapers and magazines tied with wire are a readily available heat source. Newspaper logs will never provide the level of heat wood can because they can't be compacted to the density of wood, but they're free.

Woodburners

Airtight stoves are necessary for controlled complete burning, efficient use of wood and long burning times. Cast iron stoves have proven the test of time, and some good designs have been around for 200 years. They are heavy and slow to heat but once hot will hold an even heat for hours. Also, they won't warp. Welded steel stoves are lighter and heat and cool faster.

Box stoves hold large loads of longer pieces of firewood and efficiently heat large areas. Potbelly stoves are designed to burn coal as well as wood but won't accept large pieces of wood, and therefore demand greater attention.

Fireplace inserts — heaters that fit into existing fireplaces — make a fireplace more efficient, but some can be dangerous. No specifications exist for them yet and so none are certified. Buy only an airtight unit, custom made for your fireplace. Make sure that there is no flammable material such as mantels or bookshelves within three feet of it.

Modern airtight cookstoves can sometimes handle all your heating needs. Not only will they cook and bake, but with a hot water jacket will provide domestic hot water and even heat other rooms when connected to baseboard radiators.

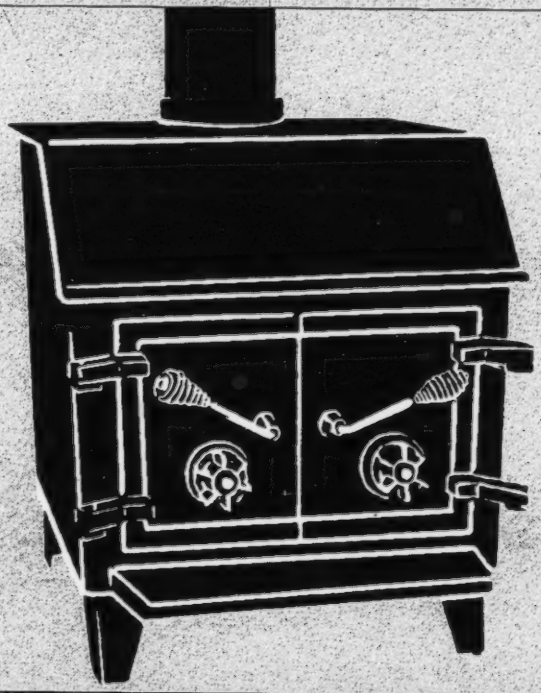
Before installing a woodburner, contact your local fire marshal. Also, a CSA or ULC approved appliance properly installed often will mean no increase in fire insurance rates. For installation guidelines write the Fire Commissioner, Ministry of the Attorney-General, Suite 1, 2780 East Broadway, Vancouver, B.C. V5M 1Y8.

Tips on Running a Wood Stove

Buy a proper sized stove for your home. Many people buy one too large and have to run it with the damper turned a way down; the resulting lower temperature causes inefficient burning and results in heavy deposits of creosote in the chimney. A smaller stove which burns at a hotter temperature makes better use of fuel and deposits less creosote.

Cresote is a mixture of gases and tars from incompletely burned wood which condenses on the inside of stove pipes. If a heavy accumulation is ignited by a hot fire, then you have a chimney fire.

Twice a day burn your stove with the damper wide open to burn off any creosote.



Switching?

If you're thinking of switching from oil to wood for your home heating, the federal government's Canada Oil Substitution Program offers grants of up to $800 to cover half your cost. Conversions to propane, natural gas, electric heating and solar power are also included (but Vancouver Island residents aren't covered for electric or natural gas installations). Don't forget to read the fine print before you install that airtight wood stove in your basement. To be eligible for the grant, your new system must be capable of displacing half the oil your present system uses, and the installation has to meet all provincial safety requirements. For further information about converting to wood or another renewable energy source, write to the federal Department of Energy, Mines and Resources, Sun Building, 100 West Pender St., Vancouver, B.C. V6B 1B6.

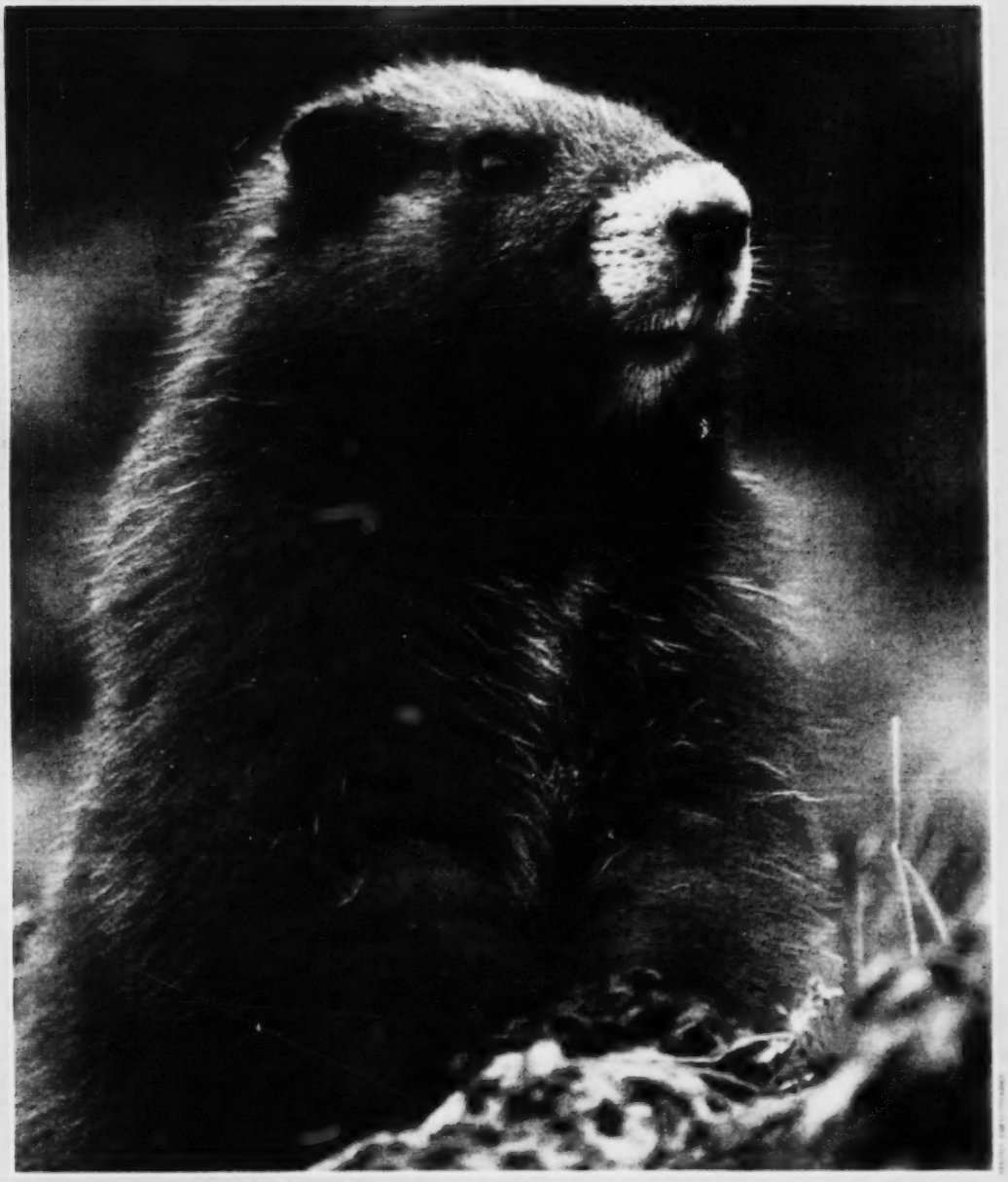
Chimneys

Unlined **masonry chimneys** used for open fireplaces may not be safe for venting the much hotter-burning airtight heaters. These high temperatures can break down the bricks and mortar. Masonry chimneys should be lined with tiles or firebrick.

Metal chimneys. A debate raged several years ago over the use of Class A (double-walled, insulated) metal chimneys for wood heaters. The problem was insulation between the inner and outer walls settling and leaving a dangerous uninsulated area. Class A chimneys are now legal if they are properly installed. Excess heat can cause the insulation to settle, so if you have a chimney fire the whole chimney must be replaced.

Clean metal chimneys with a nylon brush, not a steel one. Steel brushes abrade the chimney lining, shortening its life and making it easier for creosote to build up.

For more information on this topic read one of the many popular books on the subject. Two of the best are "The Canadian Wood Heat Book" by Gordon Flagler, published by Denuau and Greenberg, and "Modern and Classic Woodburning Stoves" by Bob and Carl Ross, published by Overlook Press.



FOREST HABITAT

The Island Whistler

Province of British Columbia
Ministry of Forests
HONOURABLE TOM WATERLAND, MINISTER

WESTERN RED CEDAR

The western red cedar made possible the rich native cultures of the Pacific Northwest. The coastal peoples called it the "tree of life" and from its fibrous inner bark they made clothing and baskets. From its trunk came planks and totem poles, masks and huge canoes. The soft wood could easily be worked with stone and iron tools which other, harder coast softwoods could not.

Today, red cedar is one of the most valuable trees in British Columbia. Its wood is unsurpassed in resistance to decay; it is light, and yet strong for its weight. It is one of the most beautiful of woods, often reddish in colour, has a straight grain and takes a fine finish. About 90 percent of the red cedar cut in B.C. is used to make shingles and shakes, which are highly valued for their appearance and durability.

In the forest, western red cedar is distinguished by its swollen butt, fluted trunk and stringy bark. It is a very long-lived tree surviving up to 1,000 years. The tree grows in moist soils from sea level to as high as 2100 metres (where it more resembles a shrub). Its best growth is on old river or creek beds, but it may be found in shallow, moss bogs or in drier locations on rich soils.